ORGANIC GARDENING

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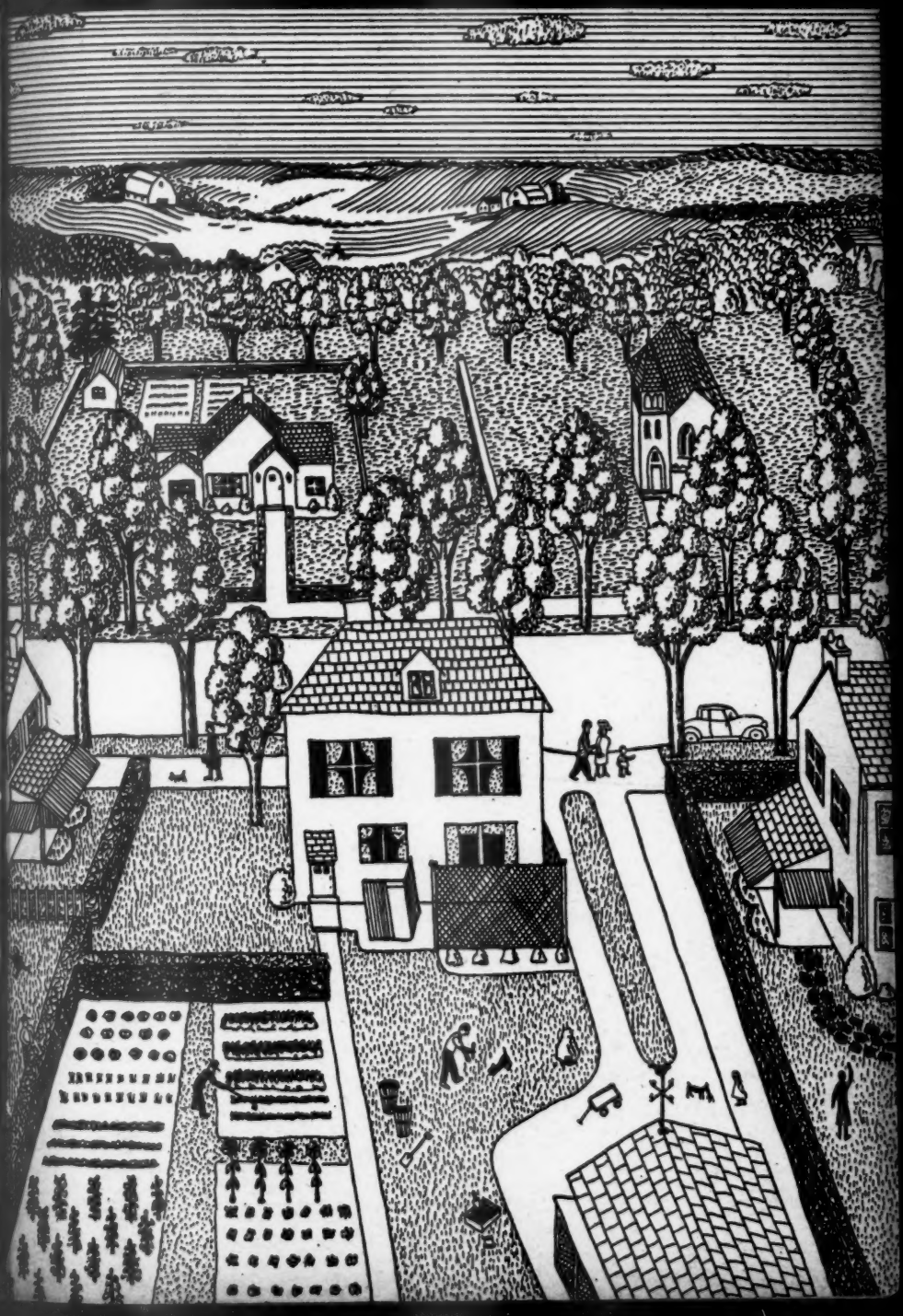

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LOOSENING THE CLAY

How I have enjoyed my first three issues of "Organic Gardening" and the booklet "Compost and How To Make It". Now I'm just waiting to get moved on my ½ acre July 1st so I can put into practice these marvelous truths as taught by Sir Albert Howard and various books. Like any other "truth" this was hard to find. My gardening experience is limited I know, only six years now, but I've had some better experiences with compost following an urge to put back on the land the organic matter taken from it, and adding more of it. I've made compost the first and every other year.

Compost after a year was coarse, porous and crumbly, dry stuff wherever it touched, the seedlings began to sprout. It softened the clay, so I thought it worth the effort. In short I am a "convert" and from now on I shall be able to make my garden harness the powers of Nature. So my work will be less and less. Already I bought some spoiled hay and straw, and have it ready, also have been given some wood ashes for first pile. I've not been able to obtain limestone yet.

I'm interested in spreading this "Gospel" for the upbuilding of the soil. Would appreciate extra literature as you mention in one book. Already I've been up against opposition.

I have run into no one yet around here who knows about this method so it's a red hot opportunity.

Nellie M. Scadaris
3011 Oklahoma Ave.,
Flint, Mich.

THE GARDENER'S POINT OF VIEW

Dear Mr. Rodale:

I wish to take this opportunity to congratulate you on the larger and finer Organic Gardening. I take several garden magazines but none can equal Organic Gardening.

I have been a professional gardener in landscape work for quite some time excepting four years out for our late war, and now that I know more of organic gardening, I begin to understand why so many of our city gardens contain so many pest-infested and unhealthy trees and shrubs. There are so few of our maintenance gardeners who understand that humus must be continually applied to the soil, especially here where there is a deficiency of humus in our soil. They usually rake up all leaves and pull all weeds and put them in the trash containers to be hauled away. They also do not understand the fundamental principles of pruning, leaving stubs to die back and eventually kill the shrub or tree.

In the past eight months I have given quite a number of talks on general gardening at various garden clubs and women's clubs in and around San Diego and I never pass up the chance to tell of the organic way, always showing your or might I say our magazine. I am also president of the Alfred D. Robinson Branch of the American Begonia Society here and have given talks on begonias to all the Branches around San Diego spreading the news of organic gardening to them also because we have one disease on our beautiful tuberous begonias; that is stem rot whereby you lose the whole plant. I know this is caused by using uncomposted cow manure in the potting soil and also over-feeding with liquid fertilizers that are derived from fresh animal manures, bringing about a fungus condition that attacks the succulent stem of the plant.

I can't tell you how much I enjoy Organic Gardening, the only magazine

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EXPERIENCED GARDENER

Yesterday received the May and June issues of Organic Gardening as a new subscriber. Found them very interesting. Wish I had known of your publication earlier.

However, in our own way my Granddad and I have been doing 'Organic Gardening' for years. I can never recall my Granddad being without a compost heap. And using very little synthetic fertilizer, his standbys being bonemeal and sheep manure, for we are city gardeners.

For the past eight or ten years we had been gardening at our summer home where we have fine sandy soil. So for many years our city garden of clay soil was neglected. But during the past four summers everything has been neglected, for my Granddad has been helplessly paralyzed for three years and everything has fallen upon me, including his care. So gardening has been rather out of the question.

At our summer home we had delphiniums growing in sun and delphiniums growing in shade. During these years of neglect some of the delphiniums in the sun are still growing. But all of the delphiniums, and more young plants are growing in the shade! The delphiniums growing in the sun have struggled hard against a crop of weeds for survival. But the delphiniums growing in the shade are in about a three or four foot section between a long row of Lombardy Poplars to the West and French Lilacs on the East. Every Fall they get a heavy mulch of leaves, which decay where they fall. The spot is practically weed-free. The delphiniums are mammoth plants with six and six-and-a-half foot flowering spikes, unstaked. They have had no care whatsoever.

I tried chemical fertilizer on the starved plants in the sunny area, but

it seems to have been harmful instead of beneficial.

At our city home we have Bridal Wreath (Spirea Van Houtti). It is the most superb display in the neighborhood—and the only one that gets no attention, year in and year out. It is just a cascade of snow from its tall tips to its ground-trailing branches. For it is not pruned leggy, as most Spirea is seen, but permitted to cascade to the lawn like weeping trees. It is very densely foliated, and all these leaves which fall to the ground in the Fall, and the windblown elm leaves which add additional mulch are never removed. The ground beneath the Bridal Wreath is never dug, hoed or cultivated. The shrubbery is too dense for such work. That is real lazy man's gardening—with beauty unsurpassed.

One year at our Summer home my Granddad brought a couple hundred unnamed, inexpensive, disease-free gladioli bulbs. At that time I didn't care very much for gladioli, and was annoyed that he bought them, for I would have preferred other flowers. But he told me to plant them. Without fertilizer I planted them eight or ten inches deep in the sandy loam, cushioning the bulbs on sand. I planted them the end of June, when all the neighbor's gladioli were quite tall. By mid-August they were flowering. The flowering stalks 5½ and 6 feet with mammoth florets and two dozen to 30 florets on each stem. The foliage was equally immense and sturdy. None of the flowers were staked. Persons came from all over and took pictures of them. When I dug up the corms most had two new large size corms and many bulblets a half-inch and more in diameter. The next year I planted the largest of the bulblets which had beautiful flowers the first season. Naturally the beauty of the glads that year and the praise went to my head—I became a glad enthusiast. At that time we were able to maintain a compost heap, and the soil was enriched with this wonder material.

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ORGANIC GARDENING — Emmaus, Pa.

THE MARCH OF COMPOST

The progress that the Indore Process is making in Latin America will be evident from the following communication dated June 30th, 1946 from Baron J. d'Etigny, Casilla 1752, Santiago, Chile and addressed to Sir Albert Howard:—

'Some three years ago I came across your *Agricultural Testament,* a copy of which was sent by the British Counsel in this country to the Sociedad Nacional de Agricultura, of which I am a member of the board.

'I read it, read it again, and at once became enthusiastic about your ideas, the way you expressed them, and the immense work you accomplished. As one of the aims of the Sociedad Nacional de Agricultura is to promote the progress of agriculture, I thought that nothing, so far, was contributing to it more than your doctrine.

'I felt that the whole book should be translated into Spanish and distributed throughout South and Central America.

'And now I wish to express very sincerely, but also warmly, to you my admiration and congratulations for what your work means to agriculture —simply the difference between life and death. If I can help in any way to make farmers, and most of all governments, understand this and become humus minded, I certainly shall do so.

'Some time ago we were visited by the Minister of Agriculture of Costa Rica, Senor Peralta. Knowing Don Mariano Montealegre's work there, I asked Senor Peralta how it was working and it was a pleasure to hear the Minister claim that the manufacture of humus from city wastes according to the Indore Process was the salvation of the coffee and vegetable growers in his county.

'In this continent propaganda is a powerful means of action. Our Society can do much to help and, I hope, will do so. As a matter of fact, all I have written and spoken on that matter has been enthusiastically received.'

THE ONLY MAGAZINE DEVOTED EXCLUSIVELY TO ORGANIC GARDENING

Organic Gardening

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PUBLISHED MONTHLY BY ORGANIC GARDENING, PUBLICATION EXECUTIVE, EDITORIAL, SUBSCRIPTION AND ADVERTISING OFFICES; 6TH AND MINOR STREETS, EMMAUS, PA. SUBSCRIPTION RATES, UNITED STATES AND POSSESSIONS, ONE YEAR $2.50, TWO YEARS $4.00, THREE YEARS $5.50. UNLESS OTHERWISE DIRECTED ALL SUBSCRIPTIONS BEGIN WITH THE CURRENT ISSUE. RENEWAL SUBSCRIPTIONS BEGIN IMMEDIATELY AFTER OLD SUBSCRIPTION EXPIRES. WHEN CHANGING AN ADDRESS, GIVE THE OLD ADDRESS AS WELL AS THE NEW. MANUSCRIPTS SHOULD BE ACCOMPANIED BY FULL RETURN POSTAGE AND A SELF-ADDRESSED ENVELOPE. PRINTED IN UNITED STATES OF AMERICA. COPYRIGHT 1946 BY ORGANIC GARDENING. ENTERED AS SECOND CLASS MATTER AT THE POST OFFICE, EMMAUS, PA. UNDER ACT OF MARCH 3, 1879.

With The Editor

A Suggestion For Compost Making

ALTHOUGH compost has been made for thousands of years the art of making it is a subject that is still in its infancy. Much research and development in this field will be done in the next fifty years and I predict that at the end of another half century compost-making will become an exact science and hundreds of agricultural scientists will devote their time to these researches. Hundreds of articles and books will be devoted to this subject. The man who is responsible for touching off the spark that has drawn world-wide attention to it is Sir Albert Howard, who has recently reached his 73rd year.

In his book, *An Agricultural Testament*, Sir Albert advocates two ways of making compost, one on the ground and the other in pits, depending on conditions. On our 60 acre farm for the first five years we made the heaps in the open. A war was being fought; we operated with inexperienced help. The labor turn-over was terrific and the compost none-too-good, for during the last four years none of the heaps were turned. They were constructed by the Howard process in layers, and put on the land a year later. During the last few years, visitors have been most frequent, and the average farmer who came said the same thing. "When will he find the time to turn the heaps?" I could see that the American farmer would never follow a system that required so much manual labor. Something would have to be done to simplify the process.

There are manure loaders on the market which reduce the labor of making and turning heaps to a fraction, which may well revolutionize our conceptions of compost-making, but they are difficult to purchase and should be redesigned so as to handle our problem more individually. For our problem I figured that making compost in pits would entail many elements of labor saving, as you shall see, so we constructed nine pits as shown in the pictures. There is also a halfpit which is used for making acid compost, in which no ground limestone is applied. This is used on our small potato crop.

The average inside dimensions of the pits are 10 feet by 33 feet and four feet high. When filling we pile the material one foot higher than the top because it will soon sink to below the top of the pit. We did not make our pits below ground level for two reasons. First, it is cheaper. It does not require digging out, except for the side wall foundations. For that, we dug down two feet. Secondly, it would be easier for a man to load the compost onto a manure spreader standing at ground level. If he had to stand three feet below the ground, and throw it up to the manure spreader, it would take much more elbow power.

I find that the average farmer who visits here can lay his own hollow blocks, thus reducing the amount of the investment. These pits will run into considerable money, but their cost will be saved many times over in the course of the years.

Compost Pit on the Rodale Farm

View of part of the Composting Center—Rodale Farm

I like the pits for many reasons, but a not unimportant one is their psychological value where you are dependent on an employee to make the compost. An empty pit has a way of yawning, and beckoning to be filled. There are so and so many pits and the yearly program requires that they be filled. If they are not, then explanations are in order.

There is another great advantage. In a pit you do not have to spend valuable time and cost in laying out and forming the sides of the heap. You just throw the stuff in, merely raking it out so that it is in the required Howard layers of 6 inches of green matter and two inches of manure (a three to one relationship). In an outside heap, the sides have to slant, in a pit the sides are straight up thus adding about 30% by volume to the heap. In finishing an outside heap a lot of soil has to be used as a covering, which goes over the sides. In a pit you use the soil only on the top.

A pit prevents the drying action of the wind. It conserves the moisture. It allows the contents to heat up right to the sides whereas in an outside pit only the interior increases in temperature. One of the most undesirable features of an outside heap is the growth of weeds on it. On a farm where forty or fifty heaps are made there may not be time to weed them and soon a jungle grows up which robs them of valuable nutritional qualities and moisture, and brother, the weeds certainly can grow tall on compost heaps. In a pit you only have the top to worry about and I have found that a 12 inch layer of leaves on the top will keep them down fairly well. Weeds may come up through straw or hay, but not so well in leaves.

A few years ago we obtained large quantities of chicken cuttings from wholesale poultry establishments and made them into compost heaps. The stench was high and dogs would burrow into it. We used this kind of material in one of the pits recently. The odor is much milder and dogs don't get in.

After working with pits for about a year I have stumbled on an improvement which to my mind revolutionizes the whole idea of compost-making. This method has been used before by the earthworm breeders in the west. I wait about eight weeks, until I am sure that most of the heating has died down, and then insert a whole case-full of earthworms along with the culture material in which they have been working. In other words, in such a size pit as I have mentioned we would put the material from a box of earthworms, four feet long, three feet wide and two feet high. The earthworms will distribute themselves over the entire pit and go to work and chew up every bit of stuff in the pit. They will return it with interest. In two months they will thoroughly break down the entire content, making the total time about four months. Instead of the farmer turning the heaps the earthworms will be glad to do it without pay. They will churn and aerate the material and turn it into the finest compost. They will enrich it with their bodily secretions. By this method we have turned out a far superior compost to any we made in the open.

I have noticed that in the pits where we placed the earthworms, less weeds grew on top, which leads me to believe that these little fellows chew up the weed seeds along with the other materials and take the sting out of them. In other words the weed seeds that are not killed off by the heating are then dealt with by the earthworms. This is terrifically important if true. When the compost is taken out of the pit we leave some of it at the bottom to act as an inoculant for the new material. The earthworms it contains will enter the new heap as soon as the heating has ceased.

The question is will a farmer breed earthworms? Why not? They are an intelligent class and do very complicated things such as applying seven

View of part of the Composting Center—Rodale Farm

Finished and half-finished compost

different kinds of poison sprays in one season, caponizing chickens, acting as wet-nurses to cows and dozens of other scientific tasks. Besides these, breeding earthworms is child's play. The only thing is they will save time, money and grief by buying their first lot of earthworms at a cost of ten or twelve dollars. From that time forward they will never have to buy any more. The original lot will multiply fantastically.

This method is practical for the largest farms and the cost of building the pits will come from the savings over that of chemical fertilizers. In the same way the method is practical for small gardens. We recommend it as more practical than the three-compartment New Zealand box. In this way only one section is necessary. For large farms the pits could be made a little wider, and minus one of the shorter sides so that a manure loader could go right into the pit.

J. I. RODALE

Do You Want To Help the Organic Cause?

WE ARE WORKING on a plan to enlist the aid of some of our readers who have the time to distribute our subscription-getting booklets and bring our message to an ever-widening circle. To those who are interested we will send a packet of booklets. Each booklet contains a coupon and a means of identification so that when a subscription comes in we will know through whose efforts it was, and will pay a liberal commission for every such subscription.

You can give them out to friends who do gardening or farming. Perhaps some friendly seed store, or church will aid you, or a garden club. Just give the books out—you needn't give them a sales talk, or follow them up. The booklet tells the whole story.

During the past month, reader-subscribers who have handed these booklets out among their friends were directly responsible for adding 110 new subscribers to our mailing list. Others who have spread our message with this easy plan have turned a few minutes of their spare time into handy spending money. Perhaps you can do the same.

Write for full details to Organic Gardening—Dept Q, Emmaus, Pa., and state whether you want 25 or 50 booklets.

Quality In Compost

By SIR ALBERT HOWARD

IN an age dominated by machinery every activity tends to be measured by the same yardstick—maximum output at the lowest possible cost. The nearer we can approach to the methods of mechanized mass production and the quickest turnover, the better. Time is money: even the reduction in the number of workers engaged in production means still more profit because of the difference between wages and the dole. Hence the frantic efforts of today to develop the machine and so eliminate the human element.

The ideas underlying industrial development have already invaded agriculture and the production of our fruit and vegetables. Any suggestion like the making of more compost from the vast unused stores of vegetable, animal, and human wastes is at once countered by these questions: Does it pay? Can it compete with the mechanized distribution of chemical manures? Can the output of food be maintained by this method? Hardly any one ever mentions the superior quality of the produce which invariably results from organic farming and gardening. The fact is forgotten that the loss of quality in our food is involving the country in a growing expenditure on health services for the succour of the flood of casualties which follow the consumption of denatured food from worn-out soil.

But a subtle change is taking place. The need for keeping up the humus content of the soil is becoming apparent. Even experiment stations like Rothamsted and the vested interests concerned in the manufacture and sale of devil's dust are changing their tune. This is evident from the recent transformation of their old slogan—*artificials or dung*—into a new one—*dung supplemented by artificials*. The threat of shortage of food and the possibility of famine are directing more and more attention to the mechanical production of humus and the reform of the manure heap.

This awakened interest in the mechanization of muck has not emerged from the thraldom imposed by modern industrial conditions or escaped the dangers underlying mass production. The preparation of compost with the help of the machine tends to lay too much stress on cheapness and on labour saving and far too little on quality. It is constantly forgotten that compost is not being made for the export trade but for the soil population—the earthworms and other invertebrates, the moulds and microbes—which together make up the farmer's invisible labour force. These organisms know nothing about economics and the present-day drive for increasing exports: they are only concerned in Nature's round. But to carry out their duties effectively and expeditiously they must be provided with the right food and the right working conditions. They need this food the moment they begin their work every spring.

These fundamental requirements of the lowly labourers which prepare the food needed by the earth's green carpet cannot be met unless we pay far more attention to quality in the making of our compost. This labour force works to a very exacting time table imposed by the seasons. It is no use giving them in the spring the crude raw materials in the shape of low-quality compost, out of which their food can be manufactured in two or three

months' time. They want the perfect compost just as the soil begins to warm up in the spring and when the growth of the crops begins. It is useless feeding these creatures after they are dead.

How can we conduct our compost making so that the soil population is properly and timely fed? By allowing the fermentation processes in the compost heap to proceed till the vegetable and animal residues are thoroughly broken down.

Are there any other ways of making high-quality compost besides that of the ordinary heap? One promising method is to harness the earthworm for this task and so convert the soiled bedding of our covered yards, cow sheds, stables, and piggeries into earthworm casts—the ideal compost as made in Nature.

The utilization of the earthworm as a maker of quality compost is described in detail on p. 15 and 16 of the introduction to the reprint of *Darwin on Humus and the Earthworm* published by Messrs. Faber and Faber in 1945. The details there given originally appeared in the issue of *Organic Gardening* (The Rodale Press, Emmaus, Pa., U.S.A.) of June 1943. The method involves the daily transfer by mechanical means of the soiled bedding of the live stock to a large earthworm pit, 100 feet long, 50 feet wide, and 2 feet deep, in the centre of the farmstead. Here the earthworms are provided with the organic food, soil, and water they need. In due course these materials pass through the alimentary canals of the earthworms and are converted into casts rich in the combined nitrogen, available phosphate, potash, and all the other minerals needed by the crop. All that is necessary is to transfer this material and distribute it on the leys just as they are ploughed up. Excellent crops result.

Too much emphasis cannot be laid on the importance of quality in compost. *The higher the quality of the compost, the better the crops and the finer the live stock.* These result from the work of the farmer's unpaid labour force, the earthworms. The simple needs of these humble workers must never be forgotten.

Nitrogen-Gathering Bacteria

SOIL IMPROVEMENT by growing leguminous plants, such as clover, peas, and alfalfa is, as everybody knows, due to the fact that nitrogen-gathering microbes of various kinds like to attach themselves to the roots of these plants. They take the nitrogen from the air and incorporate it in their nodules, which you can easily see by pulling out a clover plant. When the clover is plowed under, this organic nitrogen becomes available for the crops. The nitrogen-gatherers are rather specialized, but *Memoir* 267 of Cornell University shows that microbes associating with soybeans frequently are able to take up connections with other leguminous plants. If this is true on various kinds of soils, planting a soybean crop would be a good start for improving the fertility also for later planting of clover.

Soil Aggregates Made By Earthworms

Condensed from Soil Conservation Magazine

By HENRY HOPP
Soil Conservation Service

THE lowly earthworm's part in conserving soil is being studied by research workers of the Soil Conservation Service.

Soils experts have long known that the formation of granules helps to make the soil resistant to erosion. These granules are known technically as soil aggregates. Aggregates consist of individual soil particles cemented together into larger pellets.

The individual particles of a soil are classified as gravel, sand, silt, and clay. Gravel is made up of particles larger than approximately 1/25 of an inch. Sand particles range from 1/25 of an inch down to 1/500 of an inch. Silt particles measure between 1/500 and 1/12500 of an inch. Particles smaller than 1/12500 of an inch classify as clay.

In an unaggregated soil the particles are separate. When exposed to the erosive action of rain and flowing water, many tiny particles are carried away and the rest are packed together. Soil in this condition becomes water-logged with rain; crusted and hard with drought. When a soil becomes aggregated, the individual particles—usually the smaller ones—join together into larger compact granules. These granules may vary in size up to ¼ of an inch thick. They resist better the beating action of rain, and because they are not carried so easily by flowing water make the soil more resistant to erosion. Well aggregated soil keeps its looseness when dry or wet. Water goes in easily and the soil remains ventilated. This good balance between air and water in the soils helps plants to grow. The formation of aggregates, therefore, becomes a matter of prime importance to soil conservation.

We know that microscopic soil organisms have a part in forming aggregates. The bacteria and molds of the soil live on dead vegetation or the trash left after crops are removed. Certain of the bacteria are known to produce slimy materials capable of cementing individual particles together. Molds consist of fine threads which may serve similarly.

Now, data from the new project seem to show that earthworms are topnotch builders of aggregates.

In one test, soil from a lespedeza field was first screened. The screen had holes 1/50 of an inch in diameter. This fine soil was placed in containers and water was added. One container held the soil plus whatever bacteria and molds were naturally present. The contents of the other container were similar except that the worms were added.

After 3 days, water-stable aggregates had been formed that would no longer pass through the screen. In the soil containing micro-organisms but no worms, 5.9 percent of the soil had formed these large aggregates. In the soil containing worms, 12 percent

was in large aggregates. Thus, the soil containing worms had about double the quantity of water-stable aggregates.

Not only was the *proportion* of aggregates larger with worms present, but the *durability* of these aggregates when hit by raindrops was greater. This was determined by subjecting the larger aggregates to water dropped from a height of twelve inches. The number of drops required to break the aggregates into finer particles was counted. The aggregates formed under the action of micro-organisms alone were broken apart by 6 drops, those from the worm cultures by an average of 13 drops. The worm-culture aggregates were, therefore, about twice as resistant to the erosive action of falling water.

How do earthworms form these aggregates? Worms are unique in that they are among the few animals that eat soil. They eat the soil along with organic matter. The excrement—or worm manure—is expelled as tiny pellets. These are the earthworm aggregates.

The rate at which earthworms excrete aggregates was determined in other tests. Three different kinds of earthworms were used: *Lumbricus terrestris*, which was obtained from a lespedeza field; *Helodrilus caliginosus* from a broomsedge field; and *Helodrilus foetidus* from a manure pile. They were given good moisture conditions, a fertile soil, and warm temperature. The *Lumbricus* worms, the largest of the three species, produced about their own weight of aggregates per day. The two other species, which were smaller, produced aggregates at a slower rate. The size and shape of the aggregates varied with the kind and size of the worms, the *Lubricus* worms averaging largest. It looks from these studies as if earthworms are pretty good aggregate factories.

To what extent can farmers increase earthworms in the soil by simple methods? Results from rotation plots started 5 years ago at the Maryland Agricultural Experiment Station offer some light on this question. One set of counts was made on land cropped the following ways:

(*a*) Row cropping every year.

(*b*) Two-year rotation (row crop the first season, small grain and sod crop the second season).

(*c*) Three-year rotation (row crop the first season, small grain the second season, hay crop the third season).

The earthworms were counted during the winter on the plots that had been in row crop the previous season. About five times as many worms were present in the 3-year rotation plots as in those subject to annual cultivation.

Cover	Strip Number	Earthworms Per Acre (thousands)
Sericea	1	1,100
	3	825
	5	910
	7	1,010
	9	1,830
Average		1,136
Broomsedge	2	320
	4	550
	6	550
	8	640
Average		515

Another set of comparisons suggests that farmers may be able to keep up the worm population even with an annual cropping system. The test included:

(*a*) Row crops, in which the land is plowed and cultivated.

(*b*) Drilled soybeans, in which the land is prepared by disking and no summer cultivation is given.

(*c*) Drilled winter grain, in which the land is prepared in the fall, and left idle after grain harvest in the spring.

(*d*) Drilled winter grain, in which the land is prepared in the fall, but a summer legume is seeded into the grain or after the grain is harvested in the spring.

The results for these counts revealed that the plots in the winter grain-summer legume cropping plan contained far the most worms, about 10 times as many as in the plots planted annually to row crops. Indeed, the worms in the winter grain-summer legume plots

were almost as numerous as in legume sod plots. Good conservation use of the land and increased earthworm population would seem to go together.

A third study made by the earthworm project suggests the importance of growing legumes. An old broomsedge field on the Soil Conservation Service tract of the Agricultural Research Center at Beltsville, Md., had been partially converted to sericea lespedeza some 7 years ago. Five narrow strips, each 13 feet wide, were disked and seeded to sericea at that time, with intervening strips of the same width left in broomsedge. Earthworm counts made in early March of 1946 gave the results shown in table 2. More than 1 million earthworms per acre were found in the sericea strips, whereas, only half this number occurred in the broomsedge.

This project bids fair to add a new wrinkle to soil conservation.

The studies indicate that an earthworm may produce, under good conditions, about 1 gram or thereabouts of aggregates per day. Worm populations of the size found in this study would be capable of aggregating perhaps 500 pounds or more per acre per day. So you see that the earthworm may be a real workhorse when it comes to turning out the aggregates we want for soil conservation. The earthworm project is beginning to show that you can keep this workhorse busy and still use your land.

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(NOTE BY EDITOR OF *Organic Gardening*)—The Soil Conservation Service should have gone one step further and tested the effect of chemical fertilizers on the earthworm population.

Incredible Recommendations

ORR AND MOTT of the Department of Agriculture wrote on the effect of DDT administered orally to cows, horses, sheep. The article, which appeared in the *Journal of Economic Entomology* 38 (1945) 428 ff shows that hemorrages were frequently produced, that lesions of the nervous system occurred, that unusually marked loss of appetite occurred, and that further research was necessary to show how sprays affect the animals. The poisonous effect was extended rather than acute. The scientists conclude that there is no reason to expect any bad effects from the proper use of DDT when applied as a dust or in water suspension. I just wonder what to think about their standards for dangerousness. As long as they admit that "hemorrages were frequently produced in heart and intestinal linings" we think the poison is poisonous enough. So much research ends in stupid recommendations! Should we produce hemorrages in our domestic animals just to prove that DDT is not an acute poison?

Garden Calendar

October

North Temperate Zone: The *vegetables* that can be stored should be protected against frost. While a slight frost does not harm any of them, none is benefited by it except parsnips. It is safer to get cabbages in before it is too late. Hang up tomato plants and let them gradually ripen. Squash and pumpkin should also be harvested before frost.

The *orchard* will soon be attacked by rabbits, and you had best put on the guarding wire cuffs. Home-made ones of two thicknesses of chicken wire do the job.

The *flower* gardener is often advised to sow his hardy annuals now. This may apply to fine seeds and to places where the ground is not bare in winter; but do not sow in garden beds, unless you can put a mulch on and keep it there. Mulching is useless, if you do not hold the mulch material down because the first real blast will tear straw and hay away. It is best to wait a little, anyhow, so that the seeds do not make a growth before winter. If they stay dormant and germinate in spring you get just as fine plants as if they grew now and were wintered with protection.

Established plants, however, had best be protected with care, especially snapdragons, which need not be treated as annuals. Carnations winter usually better without a mulch, if the climate is otherwise suitable.

House plants are now established. Pot nice well-grown plants that have not bloomed for winter flowering. Wallflowers and pinks are especially suitable, but zinnias, petunias, and many others will do well.

Prepare for spring sowing and clean flats and have potting earth ready.

Store dahlias, gladiolus, montbretia, cannas, tuberose and keep in frost-free rooms and on an airy, mouse-proof shelf. Plant spring-flowering bulbs as you receive them.

Southern Gardens: The time to sow all the winter vegetables is here. Peas, cress, and many crops of more northern latitudes which normally would not thrive down South can now be attempted.

The same is true of flowers; now you may try mignonette, carnation, and sweet peas. You may succeed with hyacinths and tulips if you give them your coldest months in the ground. Start them now.

Dormant trees can be planted, but in the deep South you may as well plant evergreens if they come in peat moss and burlap and are kept moist. Winter injury is usually nothing but suffering from lack of water. If it gets cold, water the deciduous shrubs and the evergreens as well. The Northers produce much evaporation of water from soil and leaves.

Composting can go on as before, if you are equipped to keep the heaps moist. The heaps built in the North will also heat during winter if adequately moistened in building. But where heavy winter rains occur, provide some protection against leaching. An earth-covered straw layer is usually satisfactory, since straw sheds water rather readily. But boards may be desirable, too.

J. I. Rodale's Rock Vegetable Garden

Clewell

Clewell

J. I. Rodale's Rock Vegetable Garden

How To Develop A One-Acre Plot

By HEINRICH MEYER

LITERALLY hundreds of our readers have written in for advice on the large garden. They have acquired a site in the country and intend to cultivate it now so that, when building eases up, they may set the house between grown or growing trees, shrubs, and flowers. This is a sound approach. On the other hand, I am almost hesitant to set down suggestions because the *one* word LAND means a million different *things*. First, there is the question of soil, topsoil and subsoil, which encompasses drainage and fertility problems. Second, there is the slope to be considered; a site facing North must be treated differently from a Southern exposure and level land has again problems of its own; but most important of all is the question as to whether *your* site lies higher or lower than surrounding territory. If lower and in a region of long winters, many fruit trees may be entirely out, though in the same region a higher exposure would permit you to plant a varied orchard. Third, the question which concerns the architect so predominantly: how do you get to your place, which way is the house to face, where is the driveway, how much do you mean to integrate the buildings and the lay-out of the garden? And fourth, the most personal of them all, what are your preferences, hobbies, plans, and bank account? As you can easily figure out by arithmetic, there are innumerable possibilities for making mistakes. If you can afford it, call in a good nursery expert, who has been in business for a long time in your region, and save by his advice; if you have to do without professional guidance, watch the neighbors' properties and make your improvements after careful consideration. For a tree once planted and grown for two or three years is an individual that you will hate to dig out, especially if you have planted it yourself; and if the tree is growing where the driveway should be you cannot very well run the car around it. These and similar matters cannot be fully discussed in a few articles. All I can do is to give a series of suggestions that may help you in avoiding mistakes by intelligently applying them to your own conditions.

The most common difficulty of new landowners, I daresay, is the change-over from a wild piece of bramble land to a cultivated garden. There are perhaps a few trees, there are many shrubby growths, tall yellow grasses and dry weeds, poison ivy in luscious profusion, and wild blackberries. The property next door has a smooth lawn, a well-trimmed hedge, flowering shrubs, a wall garden overhanging the West side of the driveway, and other attractions. You superimpose the two pictures and add at the same time in your mind your improvements: that still does not pull out the brambles—now yours—and kill off your own weed seeds. If you have to do everything with pick axe and fork, do as the pioneers did and wrest away from the wilderness one piece after another rather than attacking the whole problem at once. Then you will not be defeated with disappointment when the weed seeds come up amidst the expensive

• Next issue will bring Mr. J. I. Rodale's startling article on Vegetables in the Rock Garden. Mr. Rodale's sensational observations and experiments will prove stimulating to many lovers of rock gardening.

lawn seeds you have so enthusiastically sown on poorly prepared ground.

If you can afford it, use a bulldozer or at least a road-scraper to prepare the rough contours. If you have plenty of time until your house is to go up, you can, however, very well grub out the brambles and cut down the weeds with your own hands, next sow a quick-growing grass or a long-lasting perennial legume and let your soil get *itself* into shape. For the suppression of weed seeds is the real problem, not cutting down the few stalky stems and growths that happen to make the place unsightly just now.

Some ask if the chemical weed-killers would help them. That raises two questions in my mind: How much would it cost to kill weeds by chemicals as against using power machinery or a team with a scraper, which is the tried method of preparing land? The chances are that the chemical would cost more and be less effective for any sizeable area. The other, more fundamental, question is the effect of weed-killers on the soil. We have previously reported that in some soils their residues were retained for a long time and that the after-effect of the hormone weed-killers was not desirable for young growth. Therefore, I recommend the old method of grubbing, sowing a cover crop and plowing it under, then several cultivations to exterminate young weed seedlings and final reseeding to lawn. But before embarking on this biggest project, see if you do not really want to leave part of the property in the wild. Quite often, a wild garden or a heath-like piece of ground between big boulders, on which you can sun yourself while bees hum about you, is better than an oversized, straggling "cultivated" garden. For unless you can go about the development with gusto, planting hundreds of shrubs and trees, you may be better off planting nothing in some parts and concentrating your plantations on the part of the property near your projected house. If, for instance, you intend to have a family orchard and vineyard, there is no reason whatsoever why you should not start it before cultivating the land. It is only necessary to do away with brambles, poison ivy, and other climbers that may have overrun the grounds; but you need not plow or cultivate. Just dig your holes, plant your trees, water them, add some more earth, add a wire cuff to protect them against rodents, and let them grow. Space them wide enough, as the nursery catalogue suggests. What do you do with the land between the fruit trees and grape vines?

On this point I can report from my own experience in Pennsylvania. When I planted my first fifty or sixty fruit trees, the land was bare, except for the stubbles from a previous owner's corn field. As a garden writer I felt I should experiment with all possible kinds of plants. Thus I sowed strips with alfalfa, red clover, white sweet clover, crimson clover, rape, flax, rye grass, redtop, and other grasses in late winter while the ground was moist. It seems that every single seed came up, which forced me to become incredibly busy with the scythe later in the year. But I know now that flax was very bad for my purpose, because it did not let anything else come up and thus bared the ground and prepared it for thistles and other undesirables. Rape did not have that effect; but while it kept weeds down it did not make a lasting ground cover. The grasses made all good stands and have since spread over the property; still my advice to all who have the right kind of land is to sow a mixture of clovers, pretty thick; either broadcast on top or drilled in rows after discing. Leave out the sweet clovers, unless your soil is too poor for the crimson, alsike, red, and white clovers. You may have to apply some lime and phosphate rock, but most likely you can get a ground cover without any further trouble. If you can mix some good alfalfa in, so much the better. By thick sowing, you keep the growth of the plants a bit lower and still suppress all weeds, including the thistles. If your soil is a clayey sub-soil-like ground, your clov-

ers will take a hold within the year; if the climate permits, you can also sow in late summer or early fall and get a luscious growth by spring. This is what I did afterward in my worst spot which was badly eroded and overgrown with brambles. But, in fall, you must cover the seeds. In early spring you may well succeed by sowing between stubbles or even on the last snow. These legumes will enrich your soil with nitrogen and also force you to make mulches around your young fruit trees so that you can find them during the first year. Later, the legumes will supply you with green matter for composting and, by the time your trees come into bearing, you will have a fertile soil and can disc under the clover for added fertility.

In the meantime, your land will look neat and well covered so that in romantic moments as you stroll over your pasture you may even consider the profession of shepherd. If you do like goats, rabbits, sheep and their lambs, turkeys and chickens, you can, of course, cut the clovers for hay or forage; but if you let them go to seed, they will keep your soil in good shape for many years, without requiring any attention. Where clovers are unsuitable, there are grasses or other legumes, about which you can find out from the Extension Service, which you are supporting through your taxes; a letter to the College of Agriculture of your state will bring you the necessary information on cover crops.

(Other articles will follow.)

Burning Potato Refuse

EUROPEAN as well as American farmers have burnt potato refuse for generations. Burning these leftovers seemed often strange when held against the otherwise so rigidly upheld practice of saving all organic material for the manure pile or compost heap. What may be the cause of this deviation? Professor Lutman, the famous plant pathologist of the University of Vermont, who last year published his startling study on actinomycetes, *Vt. Station Bulletin* 522, has now come forward with another booklet, Bulletin 528, entitled *The Spread of Potato Scab in Soil by Potato Plant Humus*. He shows how this scab-producing organism survives and reproduces wherever such infected refuse is left, but that scab is not spread by infected tubers. This is, of course, a discovery worth many millions to the growers. The discovery also shows what we have found ourselves that treatment of potato seed by disinfectants is unnecessary. And it finally shows why bonfires are going up wherever potatoes are grown. It remains to be seen if potato refuse will lose its dangerousness when composted. But this is an investigation yet to be made.

ALREADY PROFITED

After reading your magazine for about three years, I feel a word of appreciation is due you.

The science of organic agriculture seems to me, to have more to contribute to human well-being, than the more dramatic of recent discoveries have; even if they do promise much.

But since *Organic Gardening* receives recognition slowly, and it's beginnings are modest, we factory and office workers have all the more reason for appreciating you, who are pioneering this valuable work.

I never read a secular book with as great interest and entertainment as I did Sir Albert Howard's Testament, and now I would like to read Mr. Rodale's "Pay Dirt." His editorials are especially valuable and interesting.

I have already profited in a small way on my city lot by beginning organic methods and have discontinued the use of poisonous sprays, fertilizers and practices not recommended by *Organic Gardening*.

Albert Zimmerman,
1228 Smithson Ave.,
Erie, Pa.

●

TRIPLING THE YIELD

Your magazine has made three blades of grass grow for me where only one grew before.

H. G. Aune,
1232 Searles St.,
Eureka, Calif.

CURRANTS AND MULCH

In my own garden I had some currants planted but have never secured any fruit as the soil was almost entirely dust and clinkers, and dried out so completely in the spring and summer that no fruit of any consequence ever set before this year.

Along in the last of March I secured a couple of loads of pea vines from the top and sides of a pea vine silage pile with the idea of using it in my compost pile.

I put eight wheel-barrow loads of these pea vines around the currants, covering the entire patch to a depth of about three inches, and the results were immediately apparent and truly wonderful.

The bushes have just doubled in size since then and I secured a wonderful crop of large, luscious currants a few weeks ago, that literally covered each branch, and obviously I'm going to be a strong compost and leaf mulch enthusiast from now on.

H. K. Patterson,
Oshkosh, Wis.

●

GRAVEL MULCH

Last summer after your rock mulch article I covered my pansy bed with two inches of gravel. The unusual rains rotted most of the pansies out but 3 plants lived through a second winter. One of them is enormous with as many as 15 blooms, some as large as 4 inches. It must have been the gravel mulch.

Sarah W. Rule,
R. F. D. 2,
Fairfax, Va.

HEALTHY VEGETABLES

One day last summer a lady came into my store, and asked if those carrots had been sprayed? I said "No! I raised them myself. Why?" She said "My doctor told me to ask if they had been sprayed, when I purchase carrots for myself?" This lady knew I had a garden and if I raised them, I raised them without spray.

I now have your book "Pay Dirt" and find it very interesting.

Lloyd E. Johnson,
65 Main St.,
Frewsburg, N. Y.

●

POOR SAND

Even with my new tiny garden I am having a wonderful time with my earthworms and compost. Many people have become interested in your method of gardening because of the way my little patch of *very poor sand* is producing.

I believe that the work you are doing is of very great service to our country.

Edith G. Richardson,
6504 34th St., N. E.
Seattle 5, Wash.

●

INSECTS

My small composted garden is remarkably free from insects. A florist said to me a few days ago that she was very fond of nasturtiums but did not grow them as they were covered with 'horrid little black insects'. I was able to offer to give her a dollar a piece for any insects she could find on the leaves in my nasturtium border!

D. W. George,
The Button Box,
Route 10,
Southwick, Mass.

NO CORN BORER

I have been a reader of your magazine for several months and I have followed your ideas on my garden and know from experience what good can come from composting. One part I composted, the other without. The ground is the same, a sandy loam. The corn is 3 feet higher, no corn borer. The tomatoes much larger and the beans bearing twice as heavy on the composted part.

A. R. Summers,
505 Catalpa Dr.,
Royal Oak, Mich.

●

THE OLD-TIMER

"My daddy, born in 1850, was a 'manure farmer'. Yields of fruit and berries that now would be considered phenomenal, he just took for granted. I remember hearing him say once that he did not consider 15,000 quarts of strawberries per acre anything extraordinary as he'd had such production too often to be surprised. From what I learn of growing strawberries now from growers who use chemical fertilizers, 4,000 quarts per acre is considered something to brag about."

J. C. Stephens,
Box 75, Tyler, Texas

●

TREES KNOW COMPOST

"Just want to tell you about my compost pile. I spread the contents on my lawn and small garden plot. When reaching the bottom of the compost heap, I got quite a surprise: a tree, fifteen feet from the heap sent hundreds of shoots from a root into the bottom of the compost heap, some of them being about twelve inches long and coming from eight inches under the surface of the ground."

L. Matson,
1810 - 44th Ave. North,
Minneapolis, Minn.

Stages in the Development of Top Onion

Top Onions In The Garden Come Early and Are Good

By B. F. LUTMAN
Professor Emeritus, University of Vermont

THE Romans had a name for them and probably the Greeks had too; but the Latin name has come down to us and is preserved in the scientific name given to all edible onions:—*Allium cepa*. The *cepa* part of the name is the old Latin one for onions of any and all varieties.

Onions played a more considerable role in the food of ancient peoples than in that of most moderns except for the peoples who lived around the Mediterranean, the Spaniards, Italians, Greeks, and Egyptians. The ancient mobs may have howled for bread and circuses but bread alone was a rather tasteless food and some flavoring must be added to it. Meat, butter or oil was too expensive and scarce so that the relish-giving addition to the bread must be cheap and have a lot of flavor. Of course some of the odorous cheeses would have been better than a vegetable but even a bit of cheese would be too expensive for a laborer who earned only a few pennies a day. A

The new edible bulb is formed inside the old.

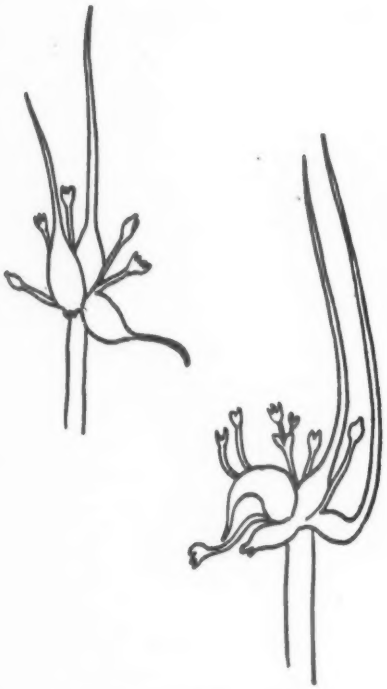
meal consisted of bread with some small addition to make it a little more tasty so that as much bread as possible would go down with a relish.

Then, too, onions in themselves were a good and highly nutritious food. We speak of onions as being "sweet" and this term is entirely correct. The onion is one of the plants which stores its reserve material in the bulbs as sugars. So, onions were good food as well as supplying plenty of taste and odor. Undoubtedly they contain some vitamins too but I never let that bother me; I still prefer to eat my vitamins with a fork or spoon and not take them out of a pill box.

When we purchased our present home and its garden, the former owner pointed out with pride a few short rows of what he called "Egyptian" onions. They had liked them especially well and wanted us to see them. We have kept them going for twenty five years with a minimum of effort and a maximum of yield. I had been familiar with onions which grew from seed to produce "sets" and with the "multipliers" which split up the bulbs after they have attained a certain size. But these "Egyptian" onions were a novelty which I had never seen in seedsmen's catalogues and very few gardeners around here seem to be familiar with them. Perhaps some of my readers may be the same way, and so, I should like to commend these "Egyptian" onions to them as they have certain advantages which others do not, especially in the extreme northern states where the growing season is so short that we have only about 130 days from spring to autumn frosts. No one seems to be able to find a reason for the name "Egyptian" for these onions but we can imagine the laborer for the Pharoahs nibbling on one of these onions while he ate his hunk of bread after drawing stones to build a pyramid or a tomb.

Bailey in his "Encyclopedia of Horticulture," recognizes three types of onions. (1). The ordinary onions grown from seed; the larger of which

Early Summer Bulbs forming.



Early Summer Bulbs and Flowers.

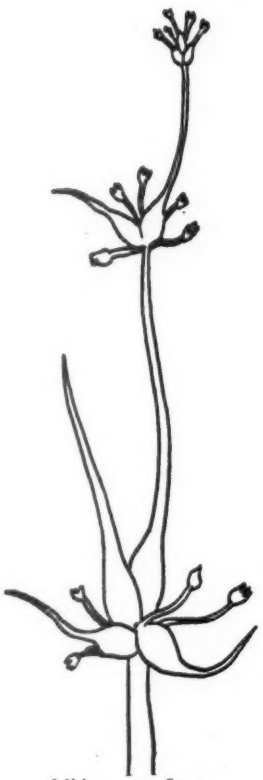
are marketed as onions for immediate use and the smaller ones are stored over the winter for replanting the following spring as onion sets. (2). The multipliers which produce large bulbs which split internally into a number of smaller bulbs which are separated and replanted for early onions the following spring. (3). The top onions, known also as tree or Egyptian onions, in which the bulbs never grow very large but come up very early in the following spring. For them Bailey has suggested the trinomial, *Allium cepa bulbifera.*

If you like young onions at any season of the year by adding these top onions to your garden you may have them fresh from the middle of May even in the extreme north of this country. The top onion is the lazy gardener's choice for they require little care. Of course they thrive best in a soil rich in humus but about all the cultivation they need is an occasional hoeing and a pulling of the weeds. They are unusually free from all the plant pests and troubles, such as maggots, insects, fungi, etc.

If part of the old bulbs are left in the row, they will send out their green stalks almost as soon as the last snow has melted, even before the lawns and pastures have begun to show signs of renewed life. The onions will be ready to eat in Vermont by the second or third week in May and continue to be good for about a month. The new and edible portions of the bulbs are formed inside the old bulbs of the previous year and are the enlarged bases of the new green stalks. About the third or fourth week in June in Vermont, one of the stalks swells up at its tip and from this swelling a clump of bulbs and flowers bursts out. The onion, like all members of the Lily family, are six-parted so that six stamens always show. If the growing season continues cool and favorable for onion growth some of the top bulbs will resume growth and a second crop of bulbs and flowers appear on its top. A third crop of the same type will often appear in July but this last one is usually composed of flowers.

As soon as the stalks begin to bear the bulbs on their tops, the best period for eating top onions on the table has passed. But, by that time, ordinary set onions are large enough to eat and are next in the onion succession. They require a little longer than top onions

Midsummer Form.



Midsummer Stage.

to reach the edible stage since they have to root themselves and get a spring start after their winter rest. The top-onion bulbs are planted in the fall and grow quite a little during the cool weather of September and October. They are all rooted and ready to start as soon as the frost is out of the ground. The top onions are entirely hardy and temperatures of -25° to -30° F. have no effect on them. The reason for this resistance to all freezing is not known but may be possibly connected in some way with the sugar stored in the bulbs, reducing the freezing point. In quality, the top onions are as good as that of set onions, being tender and sweet until they begin to put out the shoots to bear the top bulbs when they become strong and tough.

To the plant lover and botanist, these top onions are a curiosity and problem since the two methods of reproduction in plants (vegetative reproduction by bulbs and sexual reproduction by flowers and seeds) are so hopelessly mixed. We usually associate bulbs and tubers with the soil and the underground parts of plants. But, here we have a crop of bulbs produced on the top and not on the bottom of a plant. It should be added here that these top bulbs are not edible; they are as strong in flavor, or even stronger, than old bulbs; they taste more like onion seeds.

One of the old theories of botany, mostly discarded but recently revived under another name, was that plants produce a variety of substances each of which is destined to make possible a particular organ and it was in this organ that this particular "stuff" accumulated. Thus, there were bulb-producing substances, flower-produc-

Final Stage: more and more onions.

ing substances, root-producing substances, etc. But in the top onions these substances seem to be hopelessly mixed since on one stalk grows a clump of bulbs or of flowers, or a mixture of the two. Weather, rather than any particular "stuff" seems to determine whether a stalk produces a clump of bulbs or of flowers. If the weather is rather cool, the clump at the top of the stalk is likely to be mostly or entirely bulbs, that is, the vegatative growth continues. But, as the season warms up in late June or early July, onion flowers are much more common and the last that are produced are always small and are flowers alone.

But, regardless of the method of bulb production, you will find top onions are a very good addition to your garden; providing, of course, that you like onions. Seedsmen do not list them in their catalogues and this is a mistake on their part since more gardeners would plant them if they knew about them and could get a few to start a small bed or row of them. A start is all that you will need; after that, they are so prolific and hardy that a large portion of the bulbs borne on the tops of the stalks will have to be thrown away and not replanted or you would in a few years have a garden of top onions only.

Compost and Pests

FREQUENT INQUIRIES concern the heat reached in a properly made compost. According to recent checks, the temperature rises after building and after the first turning to 160-170 degrees Fahrenheit. This is enough to kill the eggs and larvae of most insects and also the seeds of many weeds, though not necessarily of all the grasses. An inquiry at the Pennsylvania Experiment Station brought us a reply from Professor J. O. Pepper, Extension Entomologist, who said with respect to Japanese beetles: "A temperature of around 130° F. for a period of 30 minutes would probably kill any stage of the grub." Since a heating compost heap stays at high temperatures for hours, even days, there is no likelihood that insects survive.

Baiting The Codling Moth

J. R. EYER of the New Mexico Experiment Station published an article in the *Journal of Economic Entomology* 39 (1945) 344 ff. He found that solid baits could be prepared which catch no friendly insects to speak of, but plenty of codling moth. Solid baits can be stored in the cellar and set out when the moths start flying; they are not affected by rain, and they are the best way out for those of us who want to avoid the spray schedules and yet have fruit that isn't wormy. The Arizona Experiment Station is in Tucson, Arizona and can advise growers on the question. It looks as though this most disagreeable pest as well as the Jap beetle would succumb to baits. This will be the best solution because we do not contaminate the orchards or the fruit, but get rid of the bugs and save millions in chemicals.

Lilies

Clewell

Ventures In Vegetable Gardening

By LEONARD WICKENDEN

(1) Taking the Right Road.

ON a rainy night in the early part of 1943 I was patrolling the wet and darkened streets of my home town, in the company of a fellow Air-raid Warden. He passed the dull intervals between the shrill blasts of our whistles by persuading me that it was my duty to contribute a series of articles on Victory Gardens to the chain of Long Island papers with which he was connected. And so, through the spring and summer months of 1943 and 1944 I did my best, each week, to keep up the morale of my neighbors who (many for the first time in their lives) were trying to add to the nation's food supply by growing their own vegetables.

I have been perusing some of these weekly columns—not without considerable embarrassment. In those days, I was unregenerate and not only used chemical fertilisers myself but recommended them to others. I glean a little consolation from finding that, even when advocating the additions of chemical fertilisers to the soil, I repeatedly stressed the importance of putting in plenty of organic matter as well. In one of my early columns I wrote:

> "For fertiliser, assuming that you have done everything possible to supply humus, the simplest procedure for the amateur is to buy a ready-mixed fertiliser from a reliable dealer."

On another occasion, I devoted an entire column to the need for organic matter and to the means of obtaining it.

In this insistence upon the necessity of adding humus to the soil, I recognize my instinctive distrust of chemical fertilisers. I realize, now, that I never liked them and never used them without a feeling of uneasiness. In common, I suppose, with all who make gardening their hobby, I find myself thinking of my plants, not merely as living organisms, but as living *beings*. I feel myself in strong sympathy with them, endowing them with personalities and the capacity for happiness or misery. I have felt that if I were a plant and somebody sprinkled sour-flavored salts around my roots, I should feel pretty miserable; but if my roots were deep in moist velvety soil, where they could bury themselves and find rich sustenance, then I should be happy. Is this too fantastic? Doesn't a healthy, robust, green-leaved plant look happy? And isn't a scrawny, drooping, sick plant one of the most miserable sights on earth?

It saddens me to think that for so large a part of my life I followed the wrong road, when, if I had only allowed my instincts to guide me I should have gained so much in gardening pleasure, health and general satisfaction. It was in April 1943 that, with a little hesitancy, I definitely took the right road. In the Victory Garden column that appeared in the April 20th issue, I wrote:

> "A few weeks ago, I saw an advertisement in the New York Times which offered, for $1.00, a six month's subscription to a monthly magazine known as *Organic*

Gardening, published at Emmaus, Pa. I sent my dollar and along came the first issue. That evening, I read it from cover to cover and in doing so spent a highly interesting and definitely enjoyable two hours. By the time I was through, my brain was whirling a little, but the gyrations were stimulating rather than unpleasant and I found I had much to think about."

In the three years that have passed, I have gone on thinking and have put a good many of my thoughts into practice. In a series of articles, of which this is the first, I am going to try to share with my fellow gardeners some of my experiences during the change over from chemical to organic fertilisers.

On the back cover of this magazine which I had found so stimulating, there was advertised a book called "An Agricultural Testament", by Sir Albert Howard. I had read enough to be hungry for more, so I sent for the book. By the time I had read it, I knew what road I was on and knew I should never turn back.

Of all the facts I have learned during my practice of organic gardening, the most important to me is one which, in a vague way, I have known all my adult life. I have known it but never felt the tremendous significance of it. That fact is that when you walk through a garden you never see more than half of it. You see the beans, the lettuces, the tomatoes, the sweet peas, the delphiniums—all the plants that are above ground. But there is another garden which you do not see at all, because it is below ground. Indeed, it is a double garden—botanical and zoological—and for every living thing you see above ground are myriads of living things below ground. It must be the earnest purpose of the good gardener to study the needs of his invisible garden, for only when the health of his underground plants and of his underground creatures is good, will he have cause to be proud of the plants which are visible to him and his neighbors. The gardener's first thought must be for those creatures which are in his care, many of which he sees but rarely, most of which he never sees at all.

Dr. Waksman, discoverer of tyrothricin and streptomycin, the life-saving medicines which have already performed miracles of healing, writes in his book "Microbial Antagonisms and Antibiotic Substances":

> "One gram of soil contains hundreds, even thousands, of millions of bacteria, fungi, actinomycetes, protozoa, and other groups of microorganisms. Under certain conditions, especially when the supply of fresh organic matter in the form of plant and animal residues is increased, the number is much greater."

Considering that a gram is less than half the weight of a dime, it did not require much imagination on my part to picture the great drama of life and birth and death which goes on hour by hour in the soil. I was no longer growing my vegetables in "dirt"; their roots were deep in a world teeming with life. Is it surprising that I paused in dismay before resorting to my poison sprayer and was filled with doubt as to the wisdom of adding chemicals?

I knew that when I sprayed a row of vegetables, inevitably a large part of the spray fell directly on to the soil. The finest spray-gun marksman in the world could not avoid it. Even if he could, the poisons that remain on the plants ultimately find their way to the soil, washed there by rain. What would be the effect of this constant poisoning on my underground garden? Lead, copper and arsenic do not decay—they accumulate. Once in the soil, there was no practicable way which I, as a chemist, could think of by which they could be removed. If they were strong enough to poison pests and fungus growths on the plants above ground, was it not logical to assume that they must also destroy the fungi and other animal and vegetable life below ground. And I had been spraying my garden for years, steadily

building up the poison content of the soil.

In the first shock of realizing what I had done, I was ready to despair. What hope had I of restoring my sick soil to health? I could not remove it and replace it with new soil—that would have been too colossal a job even for a gardener of my enthusiasm. All I could do was to follow the methods recommended by Sir Albert Howard and build up my soil with compost, hoping that in so doing I should so dilute the poisons that their harmfulness would be negligible.

I started building my first compost heap. For years, I had thrown my lawn clippings and other vegetable matter into a corner of the garden, sprinkled the heap occasionally with lime and left it to its own devices. But now I followed the Howard process as closely as I could. The big problem with me, as with all suburbanites, was to find a supply of animal refuse. At first, I used dried sheep and cow manure, and bone meal, but I did not find them entirely satisfactory. Then by persistent trying, I obtained a load of stable manure. It was delivered by a local character, named Frank, who shook his head solemnly as he climbed from his truck. "Mr. Wick," he said, "I tella you somet'ing. Stable manure, he ver-ee hard to find. Automobile, he no make none." In the five words of that last observation, he summed up the biggest problem which faces all home gardeners and perhaps all agriculture as well. If some Henry Ford would only invent a car which, when it was backed out of the garage every morning, would deposit on the floor a neat pile of stable manure, what a sale he would have among us gardeners!

One piece of good fortune came my way. The same Frank who made that wise remark about the physiology of automobiles and who took care of our village as though the whole place were his personal property, raked up the fallen leaves every fall, put them in his truck, and dumped them on a vacant lot at the end of my street. By some miracle, neither he nor anyone else had burned them. There was a small mountain of them and some of them had been lying there for years. I started mining the lower levels of the mountain and found the blackest, softest, richest leaf mold I have ever seen. Barrow-load after barrow-load I brought to my garden, until the ageing muscles of my back groaned in protest. But the joy of seeing the texture of my soil improving before my eyes was ample compensation. Of the added rewards I was to gain through the improvement of my crops, I must write in future issues.

Chemicals Kill Crops and Weeds

The Sunday *New York Times* of August 18, 1946 contained a summary of chemical weed-killers, some of which had been developed as a means of chemical warfare, since their crop-destroying capacity was quite phenomenal. The hormone specialist of the University of Chicago, Professor E. J. Kraus had thought up the scheme and the rapid ending of the war prevented the field trials in the active war theatres. One of the growth regulating chemicals, 2, 4-dichlorophenoxyacetic acid, was so effective that one tenth of a pound per acre killed off any number of growing garden plants. Many of the others, that destroy weeds, also destroy crops and some remain toxic in the soil for considerable periods. Let's not be too fiendish with our soils, even if the Professors would like to help us.

Trillium

Clewell

by H. K. MEYER

Over the Fence

DR. GARBER of the Regional Pasture Research Laboratory at State College, Pa. addressed the Crop Improvement Association on Hybrid Forage Crops and predicted 15 to 20 per cent higher yields in forage crops as a result of hybridizing and selection of desirable varieties. The problems which are involved include disease resistance, companiability, which means grasses and legumes that will grow well together, persistence, drouth resistance, etc. But from the soil angle something else must be considered, which the plant breeders tend to underemphasize, namely, the fact that higher yields tax the soil more heavily. With our present emphasis on constantly better gains, higher-yielding plants may amount to a heavy mortgage on the future by depleting the soils in the present. This need not be the case if the acreage is decreased and if thereby the old method of fallowing should come back; but if all land is made to produce more without getting a rest, we will shoulder the future with a liability.

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THIS MATTER OF SUCCESSFUL BREEDING was forcefully brought home to me the other day when I visited Dr. A. B. Stout of the New York Botanical Garden. Most gardeners know the famous breeder indirectly, because they were benefited by his results with avocadoes, daylilies, and other plants. Dr. Stout was the one to discover what is called "incompatibility" between plants of one species. He told me, for example, that the most common daylily is one that does not set seed from its own pollen. But when he brought daylilies from other parts of the world, he succeeded in getting those beautiful hybrids which now grace the gardens. It is astonishing to see those deep maroons and reds, tall wiry ones with blueish-hued stems and clusters of strongly colored flowers, when the original species were never endowed with those colors except perhaps in splotches. The Doctor plans to bring out a splendid work and I was happy to see the beautiful plates which reproduce, in an old-fashioned perfection, the original colors with life-like truthfulness.

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ONE OF THE READERS sent in a question on the nature of scents, a matter in which I have always been greatly interested. How does it happen that the common garden tulip, Gesneriana, is scentless while the Duc van Thol, (*T. suaveolens*) is sweetly fragrant? What happened to bring about such a difference between two closely related species? In following up this question I was amazed to find how little is known on the heredity of scents in plants. I had noticed that some of the roses introduced in the last decade were not grown for fragrance so much as for color and shape, though many excellent roses have been produced which combine both. If we knew how scent is tied in with other hereditary factors in roses, tulips, daffodils, etc. we could indeed breed for fine fragrance as we breed for beautiful buds.

WITH THE PAPER SHORTAGE still quite pronounced I pondered the sources of paper. A great deal of the wood pulp is grown and harvested in Canada, Finland, Russia, and other Northern countries. That is rather strange, for trees grow slowly in the North, and I wondered why the warm regions of the tropics are not used more effectively for the growing of wood pulp on a plantation scale. Why not plant quick-growing fiber plants for a steady supply of paper? We will not be able to rely on the growth of past centuries and decades forever; we will either have to decrease paper consumption or find new sources. As far as I am concerned, the one page ads in the papers could be cut down considerably, and hundreds of thousands of acres of forest could be saved in a few years. But I do hope *Organic Gardening* which has long passed the 50,000 mark will get *more* advertisers. Here, a few one-page ads would not hurt.

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SO LITTLE is known about the influence of organic matter on soil erosion that we are indebted to the Soil Conservation Service for a study by George R. Free, recently published in the *Journal of the American Society of Agronomy*, March 1946. One interesting feature brought out by his work in New York State was this: The greater the grade of the slope, the lower the content of organic matter. This would indicate for all practical purposes that sloped fields and meadows should be dressed with heavier amounts of organic matter. If on level land, ten to 20 tons per acre will make a difference over a period of years, the amounts of compost used on a slopy garden should be figured in terms of over 40 tons to the acre. This sounds like very much, but four tons are very little for a garden 40 by 100 feet, and the average compost gardener probably applies much more than this minimum. If he doesn't, he will not add much more to the bank than he withdraws.

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DDT WAS FOUND to reduce the sense of touch when applied to the skin of people. In other words, it affected the nerves noticeably, as an experiment reported to *Science*, May 24, shows.

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DDT REDUCES the formation of nodules in legumes. It is absurd to say that DDT is not dangerous when used according to specifications, because the different soils and plants and insects respond differently and no reliable specifications can be given. The evidence points clearly to this: DDT harms soil bacteria. For the original research publication by Appleman and Sears of the Illinois Experiment Station, see *Journal of the American Society of Agronomy*, June 1946.

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RECENT PUBLICATIONS tend to advertise the profitable weed-killers as harmless. The inventors and discoverers of hormone spray processes are naturally inclined to think highly of their discovery, but field experiences showed that a plant as sturdy as cotton was severely injured by 2,4-D hormone type weed sprays, the very kind that are sold under all kinds of commercial names as hormone sprays. Glen Staten of the *New Mexico Experiment Station* reports on his studies in the June number of the Journal just mentioned. It did not take more than a very tiny amount to produce damaged leaves and a relatively small amount to prevent fruit formation. This effect reached far beyond the area to which sprays could drift, another indication that our position against hormone sprays is well founded.

13½ ft. tall Dr. A. A. Gour

Harvesting Sunflower Seeds

THE difficulty encountered by the usual methods of harvesting sunflower heads is twofold. You have to go through the field and cut the heads before the seeds are ready to drop out. As everybody knows the outside seeds are dry when the inside seeds are still maturing. This is why birds start eating from the edge, a sure sign that it is time for harvesting. But then the real trouble starts: Your sunflower disks are still juicy and moist, they will become the prey of molds and fungi unless stored carefully and spread out thinly. A better method is therefore desired. Losing a few seeds from the outer rows is less serious than having the labor and storage problems found with the old system.

R. O. Weibel and W. L. Burlison of the University of Illinois just published a booklet, entitled *Sunflower Seed Production in Illinois*, which gives the following procedure under the heading, *Harvesting*:

"Harvesting of sunflowers has presented some difficulties. The heads should mature in the field. When mature, the back of the head will be dark-colored and dry. If acreages are small and sufficient labor is available, the heads are generally harvested by cutting them off with a knife and throwing them into a wagon. If fully mature and dry, they will be partly threshed out by being thrown into the wagon; and with some extra shaking, tramping or flailing, they may be completely threshed at this time. If not dry, the heads must be dried before threshing. They can then be threshed with a grain thresher if the cylinder speed is reduced. The corn sheller has also been used for threshing. Seed threshed in this manner usually needs

recleaning. This method takes time sible for the low acreage.

"The combine is the only practical machine for harvesting large acreages. It can be used successfully if the crop is fully mature and dry in the field. Some minor changes are necessary to convert the combine to sunflower harvesting, but they are not costly, especially on the newer types of machines. Seed coming from the combine does not need to be recleaned if the machine is properly adjusted. There is some loss of seed due to shattering in the field, but for the most part the heads will remain on the stalks in the field for several weeks after maturity with but little loss. There are some differences among varieties in extent of shattering."

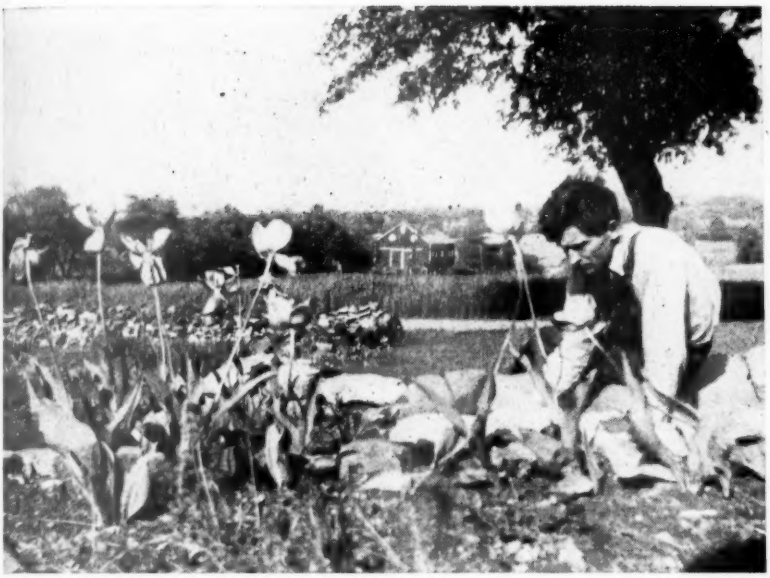
When the sunflower heads are harvested without being combined or thrashed right away, great care is necessary to spread them out so that the seeds do not get mouldy. The heads contain considerable amounts of moisture which encourages fungi. It has been found practical to spread them in such a way that they touch, but are not stacked. This, of course, requires more space than the average farm has available. But it is good enough for the small grower. While the farmer can use machinery to get the seeds out of the heads, the gardener can grate the heads on a wire screen over a barrel; the seeds drop in the barrel and the heads are added to the compost heap to which they supply valuable potash. The seeds themselves are not yet dry enough and must be moved off and on, especially when it is moist outside. If you can place them in a granary that is well ventilated or in boxes which have screen bottoms, no trouble will develop. Otherwise you must occasionally turn the heaps, for, different from grains that may sweat, sunflower seeds must not sweat.

Sawdust in the Barn

WHILE THE CHEMICAL INDUSTRY is already displaying rubber mats as bedding for cows, the wood industries look for uses of sawdust. *Chemurgic Paper* 427 by A. R. Midgley of the Vermont Experiment Station in Burlington gives some interesting data. Fine pine sawdust held more water than any other material tested. A hundred pounds of bedding held 545 pounds of water. This means, of course, that valuable liquid manure is most easily saved whenever sawdust can be had in the barn. The common belief that sawdust is injurious to crops and soils was not borne out by the investigation provided that enough nitrogen was added with the sawdust. A ton of cow urine contained in the average 25 pounds of nitrogen. A cord of sawdust, selling for about $1.50 in Vermont, held 32 pounds of nitrogen and 39 pounds of potash. Based on commercial fertilizer prices, this meant a fertilizer saving of $6.36. But knowing the superior value of organic nitrogen and potash, we may add some more than that. It is true, sawdust decays more slowly than most other plant matter, but there seems to be no proof of any sort that it can hurt the soil.

Scilla campanulata

McFarland



The author with some of his Tulips.

Fall Planting of Tulips and Other Bulbs

By HEINRICH MEYER

(*Continued from preceding issue*)

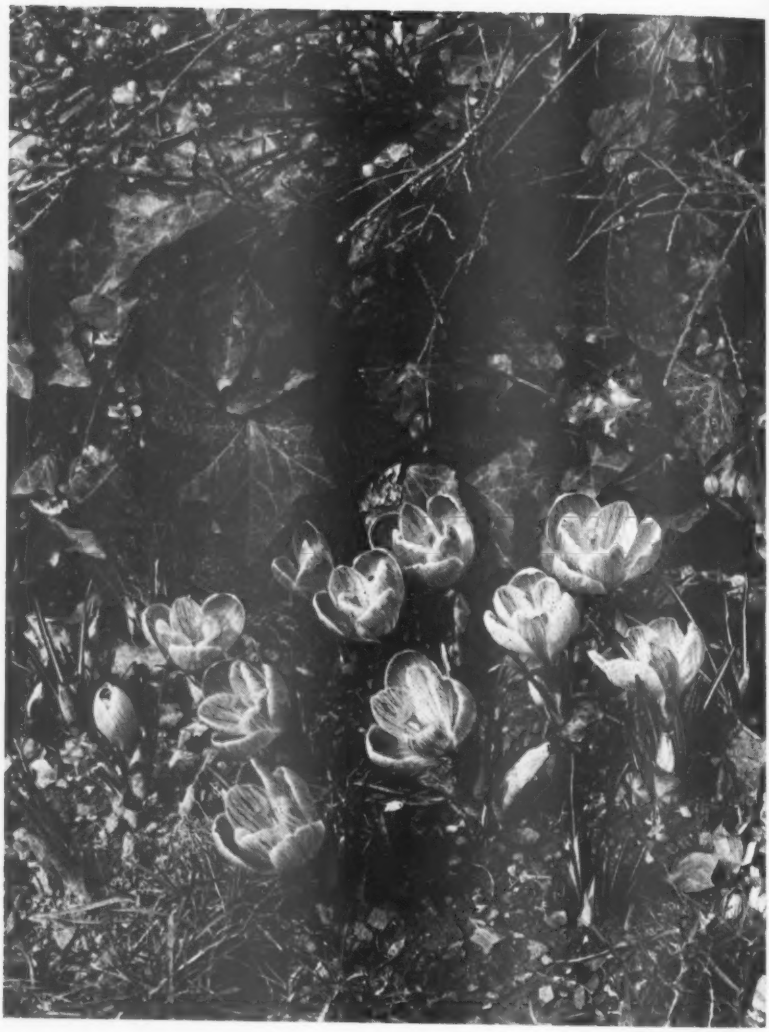
Which other bulbs should be planted in fall and how should the ground be prepared? We leave out the lilies, because a very successful lily grower and dealer, Mr. Ware, has discussed the question in the July number and also because lilies are humus lovers and differ there from the majority of the spring-flowering bulbs, which like an ordinary loam soil best. Nevertheless, you have to put well broken-down compost into the ground before you start a bed; you may also use compost for a mulch so that its nutrients seep down to the roots, but fresh manure is out. The Dutch breeders used to grow tulips on fresh cow manure, worked into the ground; but growing bulbs for sale and keeping them growing for long flowering are two different things. When you find that any of your bulbs cease to bloom, when

Daffodils Clewell

the leaves look purplish and sickly, it is time to dig them up and to put them in a different location. At that time, the many offsets, small bulbs that have formed, can be given new places too. They will usually bloom after that.

Bulbs that should go out in fall are Hyacinths and Grape Hyacinths. Of the former, it is best to buy exhibition size bulbs to get large flowers, which will not differ from forced hyacinths if the bulbs were good in the first place. If you bring them inside after they have made their growth in the ground, you can force them in a warm room, still forced hyacinths will hardly ever again be good even if later you plant them out into the open. But if you leave them outside, they are usually good for several seasons, although the size of the flowers gradually decreases. Like hyacinths, the scillas should be treated, planted in a half-shaded protected place, possibly against a drift of daffodils and Oriental or Iceland poppies. In regions of moderate winters, the ranunculus, too, can be planted in fall; but it is safer to set them out in spring, preferably against a group of blue Dutch Irises, and fronted with California poppies. Daffodils had best be planted in mixtures, the fragrant ones with the various yellow trumpet varieties. By making your own selection or buying a collection from a reputable mail order house, you can have a long blooming season. I like to interplant the narcissi with mertensias. Crocus do best near a hedge or against shrubs, where Snowflakes and Snowdrops may also be set out. Group variously-colored crocus in clusters, since they (like bulbous Irises of different color) do not all bloom at the same time. Leave them, as well as the other small bulbs, undisturbed. The natural leaf mulch under a hedge will be all they need for future nourishment.

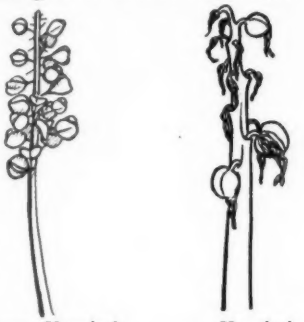
Narcissus Border McFarland



Crocus Madame Melba

McFarland

There are many other bulbs which do very well in the medium temperate region, of which I should especially recommend the Camassia which does better than other bulbs in low spots where water collects in spring. It is about the only worthwhile bulb that can stand such conditions, but the flowering stalk is rather straggly and beaten down by wind. It does not have a long flowering period, but the blueish and purplish small lily flowers on this modest plant make it quite valuable, since it blooms just before the irises. The trilliums and trout lilies or dogtooth violets, delicate flowers for the wild-garden enthusiast, should be



Grape Hyacinth Hyacinth

SEED STALKS

mentioned, but not recommended unless you can provide normal conditions for them. They should be observed in the wild so that you can give them a similar place in your garden, near shrubs, amid leaf mulch. The stately and not at all fragrant Crown Imperial of the old garden, *Fritillaria imperialis,* has no place in a small bed, because it is too domineering. But for a break in a peony border it is by no means contemptible, though its old-fashioned character has caused it to be in small demand now. There are, nevertheless, two attractive varieties, one yellow, one red-flowered.

Those who plant bulbs for the first time have two worries: How deep should I place them underground, and: Will they not freeze in winter? Where rats or other rodents abound, the much more serious question arises: Will my costly bulbs be eaten by spring?— Against the latter danger, you must set out traps or baits. But the hardy bulbs, strange as it seems, can stand the winter. Do not gamble with ranunculus and anemone; they are tender bulbs and had best be set out in spring; trout lilies are delicate and must be handled with care, as you would treat small lily bulbs. Scilla is rather hardy, but some protection by surrounding shrubs will help. With hyacinths it is good to remember that their flowers are heavy and will be broken by strong winds unless you have given them a somewhat sheltered location; the same is true of Camassia. All the others are rather tolerant to conditions. In a light soil, they can be planted five inches deep, in a clayey soil four inches would be right. A hole or slit in the ground made with a good trowel, the bulb placed down, and the earth firmed back, that is all that is needed.

Considerable controversies have gone on through the years as to how deep tulips, crocuses, and other such bulbs should be planted. While a light soil allows deeper planting than heavy loam, the main difference is this: If you plant tulips deeply, you will get regular flowering for many years; if you plant them shallow, they will form more offsets and you can increase your stock. The hyacinths should not be planted too deeply, because they cannot push up through a heavy crust. Mulching them is therefore advised in heavier soils.

Next to the flowering shrubs and the summer annuals, no group of plants is so rewarding, so easy to handle, and so surprising as the spring-flowering bulbs. Roses, lilies, and perennials are sometimes difficult; but the tulips, hyacinths, and daffodils are as simple as the irises and hemerocallis. They grow and show you their beauty before any other plants come into flowering. I am already looking forward to the many color surprises among my tulips and to the many fragrances of my daffodils and hyacinths.

Here and There

By J. I. RODALE

ORGANICULTURE

A charming couple from Columbus, Ohio visited our offices a few weeks ago and described their efforts to make "organiculture" better known in their city. I don't think there ever has been a magazine in which the readers have worked so wonderfully to extend its readership as *Organic Gardening*. On parting the man told a story "at the expense of" his wife. It seems that he wanted her help to determine what kind of Christmas present to get for her. Upon putting the question she replied, "A nice big load of manure for the garden."

The word *organiculture* was suggested by Raymond H. Stine of Wausau, Wisconsin who wrote, "I am now reading the book for the third time before releasing it to friends whom I hope to convert to the practice of 'organiculture,' the name I have coined to designate your crusade of 'Organic Gardening'." The word has euphony and should take hold. Ordinarily one would have to say organic farming or organic gardening but ORGANICULTURE covers both.

While we are on the subject of new words I would like to suggest that the name *earthworm* be changed, and my suggestion would be *earthworker*, because the earthworm certainly is a diligent worker. Somehow or other the word *worm* has a negative connotation and makes the farmer and gardener think of something disagreeable and destructive, such as the cut-worm or other disease-producing larvae. To take a benefactor of mankind such as the earthworm and call him a worm is poor reward for his beneficence. I know that this is an impossible task and probably never will be accepted in academic sources. In fact we are treading on extremely dangerous ground when we attempt to tamper with such a well-established word as *earthworm* as it well might incur the unholy wrath of the academic wordmongers. At any rate, and regardless of their attitude, I herewith submit that the English-speaking world remedy the injustice it is inflicting on this valuable earth-working creature, by henceforth referring to it as the *earthworker*. It is not only in English that this injustice occurs. In French the term *VER DE TERRE* is used, worm of the earth. In German it is Regenwurm, or rain worm. In Italian it is also worm of the earth.

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WHEAT IN THE VEGETABLE GARDEN

Those of you who are concerned about the low nutritional quality of today's commercialized foods, and who would like to do something about it should give a thought to planting some winter wheat in their vegetable garden. It should be put in about the end of September in temperate regions and will mature in July. The rows should be about three or four inches apart and the seeds may be planted rather closely in the rows, about an inch or so apart. The wheat is a seed and thus has wonderful nourishing qualities. All during winter when you do not have the fresh produce of your vegetable garden, the wheat will give you valuable vitamins and since you will have produced it by organiculture it will be doubly valuable. The harvesting will be a problem and primitive methods will have to be resorted to.

It may be eaten raw or cooked. We

make a most delicious food out of it by covering it with milk and cooking it until it boils for at least two or three minutes. The wheat is not ground up but cooked as is and it imparts a heavenly taste to the dish. We make it a practice to eat some raw and some cooked every day. This along with raw sunflower seeds should help you fortify your body so as to combat colds and other inflictions which come in winter.

The principal dish of the Hunzas of Northwestern India is *chappatis*, made of wheat seeds which they "fry" in little pots on a grille, something the shape of griddle cakes, but much smaller. The Hunzas are about the healthiest people in the world, never having cancer or the other diseases of civilization and they grow their crops strictly by organiculture.

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COMPOST FOR THE TINY GARDEN

Sometime ago a reader asked how he could make compost when the space available for it in his tiny garden was only two feet by three feet. For a moment we thought we were stumped but here is what we advised him and we have been taking our own medicine by making compost in that small area. We use small wooden boxes about 1½ by 2 feet and about 8 inches high. The material is placed in it in much thinner layers, one inch of green matter and about 1/3 inch of manure. Dried blood and bone meal could best be substituted for manure if available. Then a thin sprinkling of earth and ground limestone. The material in the box is turned at the Howard process intervals. A few boxes may be placed on top of each other. The stuff seems to be turning into well-made compost. In one box, in which we placed earthworkers, however, the compost is coming along much better, and without turning. We made one box in which the green-matter and manure were mixed together before being placed in the box, so as to eliminate one turn. This also is mellowing gradually into nice brown compost.

These small boxes may be used for making compost in the winter-time in cellars. Especially good results will be obtained by using earthworkers (earthworms). We have tried to use ordinary ones dug up from around our grounds but they do not seem to multiply under the restricted conditions of the small boxes. Good results are always obtained when the hybrids are used that have been bred specifically for this purpose.

A method that we follow in breeding earthworkers seems to be perfect for making compost in a cellar and it works in winter as well as summer. We start with a wooden case about three or four feet long, three feet wide and two and a half feet high. We make a hinged cover and line the entire inside with tin so as to preserve the wood and to prevent warping. We fill it up to a height of two feet with a mixture of equal parts, 1/3 top-soil, 1/3 green matter slightly withered and 1/3 manure. All three ingredients are thoroughly mixed before placing in the box.

Then we insert a small box of earthworkers, about the size described above, that is, the earthworkers bedded in their material of earth, manure, etc. They will work their way through the entire box and multiply rapidly but in order to encourage them to multiply to the greatest extent possible, you have to feed them. A thin layer of chicken mash thinly sprinkled over the top will be completely consumed by the "workers" in less than a week's time. The earthworkers also will consume avidly coffee grounds and sugar. They will breed unusually well if a slight sprinkling of sugar, preferably brown, is given them once weekly.

It is best to buy your first batch of earthworkers from one of the breeders advertised in this magazine. I am not saying this just to help out our advertisers, but I know from experience that such earthworkers have been

bred specifically to be happy under the artificial conditions they will have to live in. You will make much better progress in this way.

After you get your box working well, say in about four months, you can take out half the material, including the workers in it, and apply it in the garden, but from that point on you can do so every two months. Think of it, by this method you can make compost in only two months, you can make it in winter, and you will have a compost double or triple the quality of what you can make in the ordinary way. Bear in mind that the earthworkers, will chew up every particle of stuff in the box, including weed seeds and you will not have to turn the materials.

When you take out half of a box you fill it again with the same mixture of materials you started with, namely earth, manure and green matter, and in sixty days it will be thoroughly broken down. You have to keep your boxes nicely wet, but not too soggy.

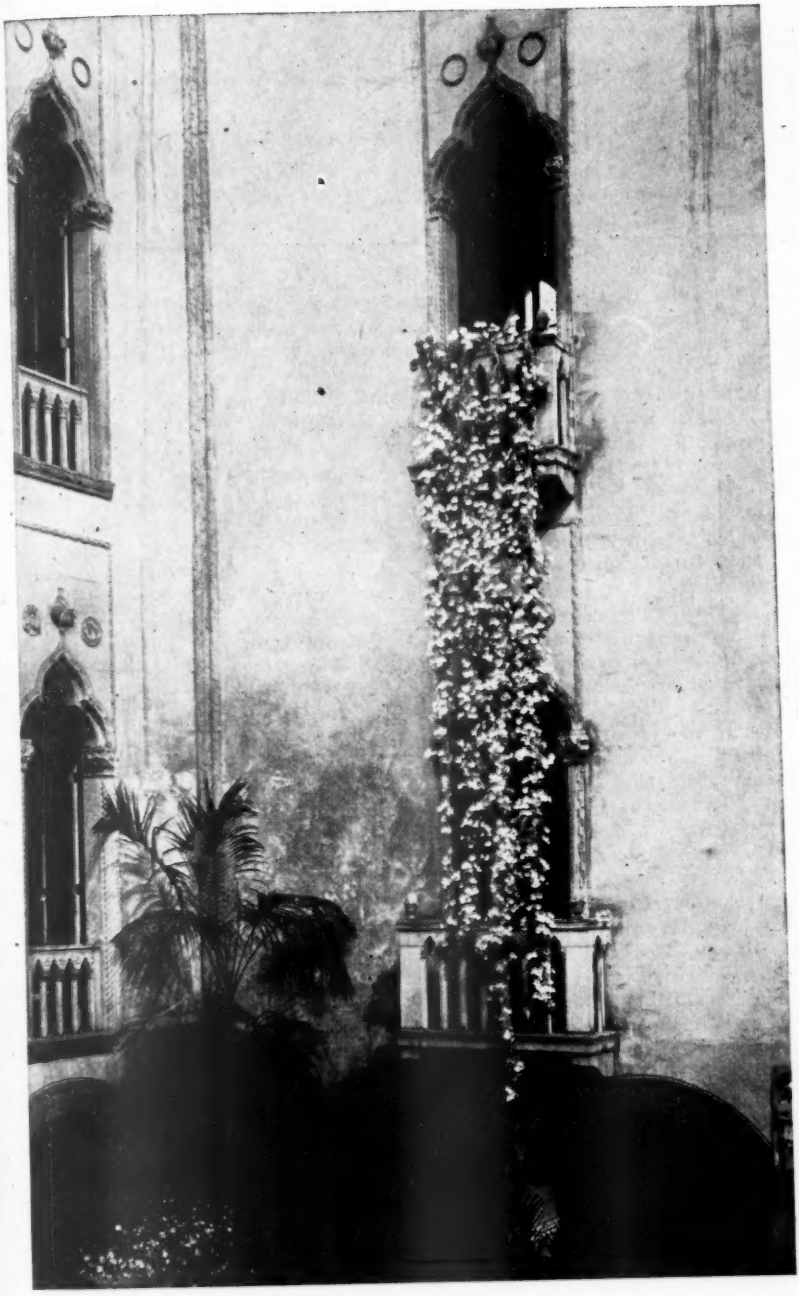
As green matter for earthworkers, nothing can beat leaves. Always keep a pile of half rotted leaves available for this purpose. If you can do so use leaves in the boxes exclusively as your green-matter because not only do earthworkers love it, but it is most rich in minerals, due to the fact that trees send their roots down 25 to 50 feet into levels where the mineral matter has not been exhausted. If you can keep two or three such cases going all year around you can make a tremendous amount of compost.

If you want to put the compost into your garden without the earthworkers, you work on the basis that they do not like light. Take some of the material about two inches thick on a board and let an electric light shine intensively on it. In about five or ten minutes the little fellows will work their way down and you can then scrape off the upper inch of stuff. You keep on repeating this and can place the residual earthworkers back in your culture box to increase the working population.

For the city gardener this method is perfect as it keeps your garden free for growing things.

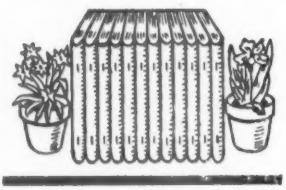
Diabetes Cure?

RESEARCH WORK in India points toward a possible beneficial effect of *Scoparia dulcis* L. on diabetes. Linnaeus called a certain group of plants Scrophulariaceae because he was convinced that these plants had an effect on scrofula, which was frequently a vague term meaning diseases of the lymphatic system, but often referred to tubercular infection. Common plants in this family are the snapdragon and linaria. *Scoparia dulcis* grows from Texas to Florida and is related also to *Scrophularia marylandica* which goes under the common name of Heal-all or Pilewort, which is at least an indication that the old herbalists found it effective against other ailments. Another famous herb in this family is Mullen, the wool or velvet flower, flannel leaf or candlewick. As the research work progresses we shall attempt to report about it.



Hanging Nasturtium

Isabella Stewart, Gardener Museum, Boston



NEW BOOKS

Some books that have come to my desk of late: S. A. Wilde's *Forest Soils and Forest Growth* (Chronica Botanica, Waltham, Mass.), a technical treatise of great value to forester and botanist and all those interested in the organic approach who can read technical literature.—Andrew D. Rodgers, *American Botany—Decades of Transition* (Princeton University Press), not as well written by any means as the author's works on Coulter and Torrey, but a useful collection of materials on the period of 1873-1892. We get a better picture of university politics than of botany.—S. A. Waksman, *Microbial Antagonisms and Antibiotic Substances* (The Commonwealth Fund, New York), another one of those standard texts for which Professor Waksman is justly famous. It is good to have such a text from one of the men most active in developing the study of antibiotics; for, while the research work constantly progresses, a resumee of known data is helpful to the layman and suggestive to the scientist.— Lane Cooper, *Louis Aggasiz as a Teacher* (Comstock Publishing Co., Ithaca, N. Y.), a charming and beautifully written book on the teaching methods of the famous naturalist. This well-made book is non-technical and will be a good acquisition for the nature-lover's book shelf.—The Houston Council of Texas Garden Clubs (2007 River Oaks Boulevard, Houston 6, Texas) put out *The Gardener's Cook Book,* available for $3.—A useful book published by University of Washington Arboretum Foundation, 516 Medical Arts Bldg., Seattle 1, Washington is the *Handbook of Rhododendrons,* 2nd printing, $5. While the book is expensive, it is nevertheless an authoritative guide on azaleas and rhododendrons. Personally, I like best the lists, especially the one which shows when rhododendrons have flowered in the Northwest. Lovers of the plant will be glad to learn that the blooming period extends from February till September. The omission of the two books by Van Dersal in the list of literature is, however, as inexcusable as the high price.—H. P. Stuckey is the author of a book, entitled *Southern Horticulture* (Turner and Smith, Atlanta, Georgia). Dr. Stuckey is the Director of the Georgia Experiment Station and his book is already in use as a textbook, as well it should. The home vegetable garden is discussed, but the bulk of the book is devoted to the fruit orchards of the South. Peaches, naturally most prominent in Georgia, are followed by apples, pecans, grapes, the various berries, melons, tomatoes, peppers and potatoes. The book is old fashioned and simple, everybody can understand it; but it packs a great deal of information and is thoroughly practical.—Many times have I wondered who wrote those charming country items on the editorial page of the New York Times, thoughtful bits of country experience tempered with information for the city dweller, balanced and warm-hearted. Now I know, because the author has collected his writings under the title *An American Year* (Simon and Schuster, New York City) $3.50. Hal Borland wrote them and a group of American artists supplied illustrations, which are excellently reproduced.

—MEYER

The Gardener of the Archbishop

(From an old Spanish folk tale)

Re-told by ROGER W. SMITH

THE archbishop of Seville loved his garden, he spent many pleasant hours walking slowly over its many acres. On this summer day he moved slowly, now deep in thought, now watching the swans that sailed the quiet lake while the light breeze caused his long, black robes to ripple.

Occasionally he was lost in concentration upon some obscure ecclesiastic problem, more often he was enjoying the fragrance of a jasmine or oleander. Sometimes he left the garden's grassy path so that his sandalled feet might bring to him the bitter aroma of the chamomile, the heavy scent of thyme or sage, or the refreshing fragrance of the mint.

On this day he paused to watch Pedro Ximenes, his old gardener. The sturdy Pedro was working with shovel and mattock clearing a ditch.

"How long have you been with me, Pedro?" He spoke as if to a brother.

Pedro bowed. "Twenty nine years, your excellency."

"That's a long time. Do you know, sometimes I think a change might be good for both of us. Quit your labors and come over here behind this screen."

Pedro, carrying mattock and shovel over his shoulder, dragged his feet out of the sucking mud and obediently followed the archbishop.

Beyond the screen of flowering myrtle was a rustic bench. Upon this the archbishop placed his robes. "Put all your outer clothing upon the bench," he told Pedro.

"Even my boots?"

"Yes, even your boots. Now you will step over here and don my robes and I will step over there and don yours. For the rest of the day I am the gardener."

It took Pedro some time to become accustomed to the sudden change but eventually he was walking slowly admiring the perfection of the box hedges and sniffing the fragrance of the flowering bushes.

The archbishop went sturdily to work with mattock and shovel clearing the ditch. Soon he began to sing happily even though his boots leaked.

Near the ditch, but hidden by a ten-foot cypress hedge was the Camino Real, the highway. Pedro, in his walks had seen them coming, three young black-clad divinity students, each astride a donkey.

Soon the three students clattered through a cobblestone entry in the hedge and approached Pedro slowly and humbly asked permission to speak to him.

Pedro, with a great show of dignity gave his consent. He would answer one question only. Each student re-

cited his elaborate question astride his animal, for Pedro had not given them permission to dismount.

In the meantime, the Archbishop of Seville carrying his mattock, had come near enough to hear the questions and was embarrassing the honest Pedro by his smiles.

Finally Pedro got mad, he turned angrily on the three students. "It is disgraceful that you should come to me with such infantile questions. Even so lowly a person as my own gardener here can doubtless answer them."

Leaning upon the handle of his mattock, in his rough clothes, and with the mud of the ditch thick upon his boots and sweat yet upon his brow, the Archbishop of Seville answered each question quite well.

"You know now the answers," said Pedro, a slight breeze tugging at his black robes.

A peacock on the green lawn spread its eyed fan. The Archbishop of Seville went back to his ditch and the divinity students went on their way.

"Such wisdom," they marvelled. "The Archbishop of Seville." Even his lowly gardener is so wise that he can answer our most difficult questions."

But when evening came Pedro went over to the ditch where the archbishop worked and sang. "How did I do?" he asked.

"You made out quite well," said the archbishop, pausing in his work. "How am I doing with this ditch?"

Manure and Phosphates

AT THE VERMONT EXPERIMENT STATION two agronomists, Midgley and Dunklee, have for the past few years made a series of most interesting experiments on what is called "phosphate fixation" in the soil. It has long been known that phosphorus added to certain kinds of soil becomes tied up with other soil minerals and then becomes more or less insoluble and therefore locked away. The plants cannot get the phosphorus they need. It turned out now that, when phosphorus was added to the manure, the manure absorbed the dry phosphate and keeps it from contacting the surrounding soil too quickly. "Each piece of phosphated manure acts as a storehouse or cupboard of well-balanced plant nutrients." While the experiments in Vermont were made with superphosphate, the principle involved is important for other sources of phosphorus too, especially those which organic gardeners use, namely, colloidal and rock phosphate. On the Rodale farm, phosphate rock is applied in sprinklings to the compost heap. The results were always excellent. Now we know why: The organic matter acts as a storehouse for the phosphorus and the plants can get at it more easily.

Agriculture and Teeth

By E. BRODIE CARPENTER, L.D.S.R.C.S.Eng.
Dental Officer, Royal Commercial Travellers' Schools, Middlesex, England

Reprinted from The Dental Magazine and Oral Topics, March, 1946.

The effects of increased quantities of healthy food on the teeth of the children of the Royal Commercial Travellers' School.

This school was founded one hundred years ago for the orphans of commercial travellers. The numbers vary from term to term, but in recent years there have been about 95 girls and 135 boys in two separate establishments in the same buildings. There is a good deal of land attached to the school, and from it in the years before the war the school was getting a certain amount of its vegetables. When war was obviously inevitable the head gardener ploughed up a further five and a half acres which used to be a paddock for the horses and brought this under cultivation for vegetables also. Every year since then he has grown more and more vegetables until now the school buys none at all.

The system of agriculture would meet the approval of the most fastidious of the "natural manure school." Every ounce of waste is returned to the soil, and up to a hundred pigs are kept for their manure, which is composted with clippings from the playing fields and with straw. No artificial manure is used at all. The vegetables grown are like the pictures on the seed packets.

It is a curious fact that part of the five-and-a-half-acre field is silt from the River Pin: this is in accordance with agriculture on the banks of the Nile. It is even more extraordinary that a smaller field was used by the L. M. S. for spreading the night earth from Hatch End Station in the days of earth-closets: this is the method of the Chinaman, who has cultivated his own bit of land with his own and his animals' wastes for 4,000 years.

The produce of the school's land has gone up by 33⅓ per cent. since the war for *nearly a hundred fewer children,* the numbers now being 240-250, whereas before the war they numbered as many as 340.

Now what is the effect on the teeth? I took up the appointment of dental officer at the school in 1939, and at the first examination was very perturbed at the state of affairs. I graded the boys and girls into "A" for none to two cavities, "B" for three to five, and "C" for six and upwards. "A's" were 50 per cent., "B's" 32 per cent. and "C's" 18 per cent., and I found a number of cavities in "fronts."

I settled down to an oral hygiene campaign and started with the "fronts," but the trouble was that all the children leaving had to be completed by the end of the Christmas term. I toiled on through that school-year and the next, examining them every nine months.

In September, 1941, things were no better: "A's" were 56 per cent., "B's" 27 per cent. and "C's" 17 per cent. In 1943 and early 1944 there was a very obvious general improvement—cavities were fewer and the unhealthy, gluey sort of saliva so often seen in the adolescent age was decreasing. By 1945 the examination showed that "A's" were 97 per cent. and "B's" 3 per cent.

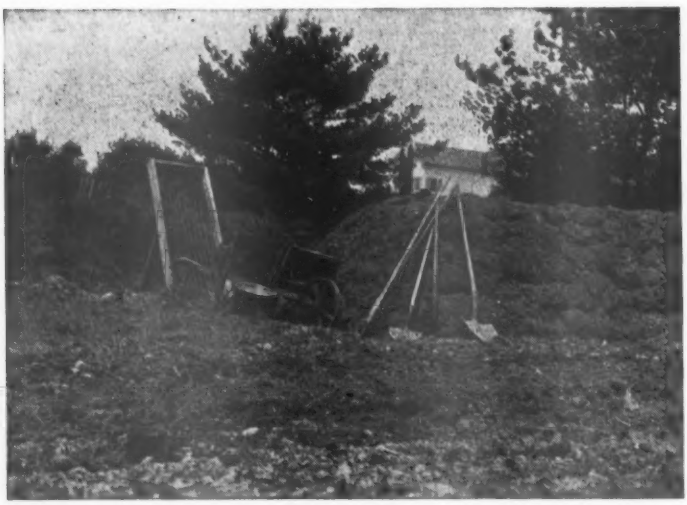
This was dramatic enough, but in September, 1945, there was an average of a quarter filling per child and the boys were 100 per cent. "A." Out of 230 children examined in a period of nine months, the child (a girl) with the most cavities had four. (Grading of the girls: "A's," 97 per cent.; "B's," 3 per cent.)

This simply astonishing change, I feel quite certain, is to the credit of the Board of Management and of the gardener—not mine. How else could one account for the *absence of incidence?*

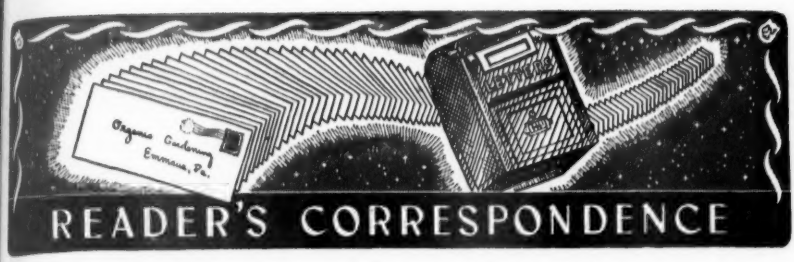
I am well aware that there are other items of diet, but I am convinced that, provided that there are no excesses in the rest of the diet, fresh vegetables provided by a sound system of agriculture are the corner-stone of dental health.

The bread at the school before the war was not white but a special brown "Nevill's" loaf. I consider 100 per cent. wholemeal to be the ideal. The children have always had enough milk, and sweets (if these make any difference, which is doubtful) have always been regulated. The animal protein is restricted, as are fats. Eggs are new-laid on the premises.

The diet, in short, is an ordinary all-round one, except that the "vegetable protein is properly synthetised" and in abundance.



A Reader's Compost pile — D. N. Gilpin



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COMPOST AND WINTER

Q. With the cold weather approaching I want to ask some questions on compost. Is it better to apply the compost to the soil as soon as it is ready for use, that is, in the fall, or let it stand till planting time in the spring?

Is it better to turn under in the spring a green "cover crop" of rye and vetch, or cut the green growth in the spring, and place it into a compost heap?

Is it better to apply compost to a lawn in the fall or in the spring?

A. N., St. Louis, Mo.

A. If you can protect the compost against leaching, you had better save it for spring use. If you cannot so protect the finished or half-finished material, it is better to dig it in now than to let it leach out.

Turning under a green cover crop may seriously endanger the fertility of the garden, because the bacteria in the soil will be required to digest the green matter when they should be available for the growing plants. A cover crop of vetch is less hard on the garden than one of rye, because as a rule vetch contains more nitrogen than even the young rye. As a result of this the nitrogen in the vetch will be used up and soil nitrogen will be still available for your crops. However, on the whole, I should advise composting rather than turning under green matter in spring.

Weed-free compost had best be applied when the lawns start their growth again, that is in spring, but fall applications do no harm. If therefore you have no means of storing the compost, you could use some of it on the lawn in fall. However, if the lawn is newly seeded, do not make an application because you might stifle the young growth.

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SOIL PROBLEMS

Q. I am a new subscriber to *Organic Gardening* and have just started my first compost heap, and am very anxious to get help for my garden. It is located where soil was hauled in, and instead of being good garden soil, it is mostly clay—very heavy and hard after a rain.

I have had the soil tested with the following result:

Lime—pH8
Phosphorous—D
Potash—C
Nitrogen—B

I was advised by the person testing to use stable manure and plant rye this fall. In spring I was told to spade in the rye, and add 10 lbs. aluminum sulphate and 40 lbs. 2-12-6 fertilizer. My garden is 54' x 26'.

From your magazine I find that this is not the correct thing to do, and I am wondering just what you would advise. Will compost alone change the high lime content? Naturally, I am anxious to have a good garden as soon as possible. I live in the city and do not have access to stable manure very easily. However, I think I can purchase some this fall.

V. D.,
Manitowoc, Wisconsin

A. The way your soil analyses, I think the mere spading under of green matter will be helpful. Your soil is now very alkaline. By putting large amounts of organic matter in the ground, even in the raw form, you will soon remedy this situation. My advice would be, since your garden is not very large, to get as many leaves as possible and to superficially dig them in this fall so that they almost form a mulch.

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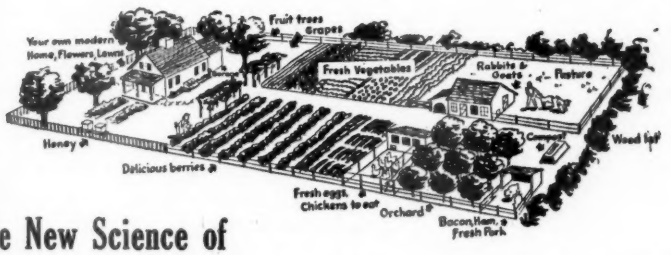

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—o—

DATES

Q. We seem to have constant trouble with our date grove. All the recommendations which we have followed have not produced the desirable effect. The trees are ailing and do not bear as they should.

G. C., Arizona

A. As a rule, dates suffer in your state from nothing but shortage of water. In the East, dates are grown in oases, which are regions with subterranean springs. Often, the natives must go to extreme troubles to dig out thousands of tons of drifting dunes which tend to bury the plantings. But they do so because they know that the dates must be so planted as to reach the water beneath. In the Southwestern United States, climatic conditions are favorable to date growth, but frequently the water requirements are not adequately filled. Without water in abundance, no nutriments become available, and without these no growth can take place. Inquire as to the water conditions before you give up hope. But see if you cannot use mulches to cut down evaporation and thus to store water for your palms.

—o—

MINERALS IN FOOD

Q. Where can I find information on minerals in carrots, beans, etc.?

J. R., Washington, D. C.

A. The United States Department of Agriculture put out the Yearbook FOOD AND LIFE in 1939 at $1.50. This is a veritable encyclopedia for the

dietician and health-conscious cook. You can order it from the Superintendent of Documents, Washington, D. C., enclosing a money order.

—o—

PEONIES

Q. How and when do I apply compost to grow good peonies?

T. A. C., Vincennes, Indiana

A. In your place I should apply the compost this fall so that it breaks down in the ground during winter. In spring the material will be sufficiently decayed for new plantings. With established plants I personally had the best success in just making a moderate top-dressing in fall. The material serves as a mulch, breaks up and gradually seeps down in the form of nutriment for the roots. If an old peony patch becomes weak and cannot be divided, heap some more soil on top. Soil washes off all the time and the layer on top of the fleshy roots becomes less and less unless it is occasionally restored.

For spring culture, loosening the soil had best be accomplished when weeding, before the peonies have made their growth; personally, I prefer to clean my perennial beds in fall and give them my mulches then. As Mr. Rodale points out, leaf mulches tend to keep weeds down. Another advantage is that leaves can be easily kept on the ground with a small covering of earth, while other mulches tend to be blown away. A small amount of compost will also keep leaves down on the ground.

On the whole I should warn against excessive applications of anything to peonies. They thrive for decades when disturbed rarely, they start ailing when being pampered and worked over. The peony is naturally a sturdy plant that thrives in loam and sand and even in heavy clay if that is loosened with organic matter. When diseases strike, burning the dead leaves will not help much; then comes the time to prepare new land and transplant. I never burn old stalks and leaves, but simply add

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them to the compost heap to make more peony food for next fall.

—o—

BLOOD

Q. I can get from a local slaughterer about 25 gallons of blood—what do you suggest I do with this blood?

B. M. C., Marietta, Ga.

A. I would use the blood as part of the compost heap. It will supply great amounts of nitrogen. Dried blood is sold as a very valuable and expensive fertilizer, besides being used as part of commercial chicken feed. You have to guard against flies and ants by covering the heap well.

—o—

IRRIGATION FARMING

Q. I have just read the book *Pay Dirt* by J. I. Rodale, and I wish more information regarding farming with composts.

No mention was made of irrigation farming, which is the kind done in most of my section of the country, (Southeast Idaho), and what effect irrigation or flooding the ground has is one thing I want to know? Also by compost farming is it possible to expect good crops without rotating often? I have in mind wheat raising as a main cash crop, with enough hay for feed for cattle, and small garden with small orchard.

B. R. C., Idaho

A. The irrigated areas are areas low in organic matter; composting should therefore be highly beneficial, since you could at the same time dispose of cattle manure and stretch its effect. By leaving out the lime in the compost, you will get a more acid compost and thus be able to counteract the alkalinity of your soil.

Compost is usually applied to the heavily fertilized crop in a rotation, for example, to corn. The residual effect will carry over and produce better wheat the year afterward. But compost is not often applied to small

grains directly, especially not on heavier soils, because too rich soil may produce lodging of the grain when the season is moist. In the West, where large wheat areas exist, the amount of compost available will undoubtedly not be so large as to endanger the crop. But when in doubt, apply it before seeding a legume crop.

—o—

PINE NEEDLES

Q. I am a subscriber to your magazine and moving south permanently next month. Am very interested in organic gardens and expect now to have a glorious opportunity to work it out.

Will you please tell me at your convenience what place, if any, pine needles might play in preparation of humus?

I know such needles are acid and they provide an efficient mulch for rhododendrons, azaleas, etc., and am wondering about their effect on humus.

I will have an enormous quantity of leaves—oak, hickory and poplar, in addition to pine needles and they are not too difficult to separate.

F. H. H., New York City

A. A small amount of pine needles will not make a sufficient difference, though, on account of the terpenes, they decay very slowly. Oak, hickory and poplar leaves, incorporated without composting, break down very easily and form humus more rapidly than if kept in large piles outside. Recent research at the John Innes Institute in London has shown that such leaves have a higher fertilizer value than leaf mold. The only thing necessary is the addition of some nitrogenous material. I, personally, prefer hoof and hornmeal not only because it contains also phosphorus but also because a hundred pounds of it contain approximately fifteen pounds of nitrogen at the relatively lowest cost.

There are no scientific data on the danger point regarding pine needles and we have, therefore, recommended not to use more than 5% of the volume unless adequate amounts of lime have been added to counteract acidity.

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ONE OPERATION OR CONTINUED COMPOSTING

Q. What I would like to know is: Am I getting the proper compost when I throw the material on the heap as I collect it?

W. R. R., Philadelphia, Pa.

A. The reason why a heap is to be built in one operation is the heating, which destroys disease organisms and seeds. By throwing material on the heap or putting it in a box as things come to hand, you get, of course, rotted plant matter; a certain amount of heating also takes place. In fact, even without the addition of manure, some decomposition takes place. But the diseases and weed seeds will largely survive. Leaving the heap standing for long periods may gradually eliminate the disease organisms, but most of the sturdy weeds will survive, unless the heap is rebuilt. What you are doing is quite useful: You collect material for a compost heap. But when you have enough, broken down in part, then you should make the real heap and build it according to the rules. On a farm scale, such care is perhaps not always needed because the weed problem is not so serious. Mr. Rodale, for instance, recommends the assistance of earthworms instead of turning. But he very wisely *lets the heap heat first*, and he very carefully *had big pits built* with which to keep the heat and moisture at an optium. In the average gardener's case, I should always recommend: Build heaps in one operation. Turn the heaps to get another spurting of bacterial action and the accompanying heat. Continued composting is sound when you add new heaps, but you should not add raw material to the finished heap.

—o—

FALL OR SPRING PLANTING

Q. What is your position in connection with the planting of shrubs and trees? Should I plant them in fall or in spring? I am talking about

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trees and shrubs that go around a house.

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A. The problem is quite complicated. You may plant deciduous shrubs and trees in fall; those are the plants that lose their leaves and therefore do not transpire much in winter, but are relatively dormant. They will begin to send up their shoots in spring. The matter is different with the evergreens, whether they have needles or broad leaves. Those leaves stay on through the winter and give off water. As the plants in moving cannot but suffer some damage to their roots, even if they are well bagged, and as they cannot so easily become established during the short time before cold weather and shortage of soil moisture set in, they transpire more than they take up, unless attended to with great care. I should therefore plant evergreens in spring. The farther North we go, the safer it is to plant all trees and shrubs, deciduous or evergreen, in spring, and I should therefore recommend that you order now for spring delivery. If you should have planted some evergreens by now, put on a good mulch and keep the plant moist.

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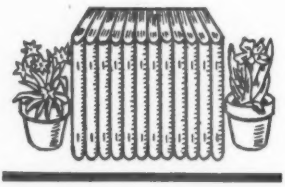

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This is a remarkable book published by the conservative Oxford University Press. It gives the complete history of the Sir Albert Howard method of making compost. It describes the events in the West Indies and in India that led up to this epoch-making discovery. After reading this amazing book, if it does not thoroughly convince you that the organic way is the best, your money will be cheerfully refunded. Many gardeners date their conversion to the ORGANIC METHOD from the time of reading this Testament.

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Pay Dirt

by J. I. Rodale
Editor of *Organic Gardening*

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